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To facilitate your hardware and software warranty, you need to register your system with DIGITAL's Customer Support Center by calling: 1-800-DEC-8000.

Instructions

1. Locate your system model number and serial number (from the back of the system box) and record in the spaces provided below.

SYSTEM TYPE _____ SERIAL NUMBER _____

2. Call the Customer Support Center at 1-800-DEC-8000 and register your system. Please be ready to give your company name, address, telephone number, and the contact person for this system.

Warranty Description

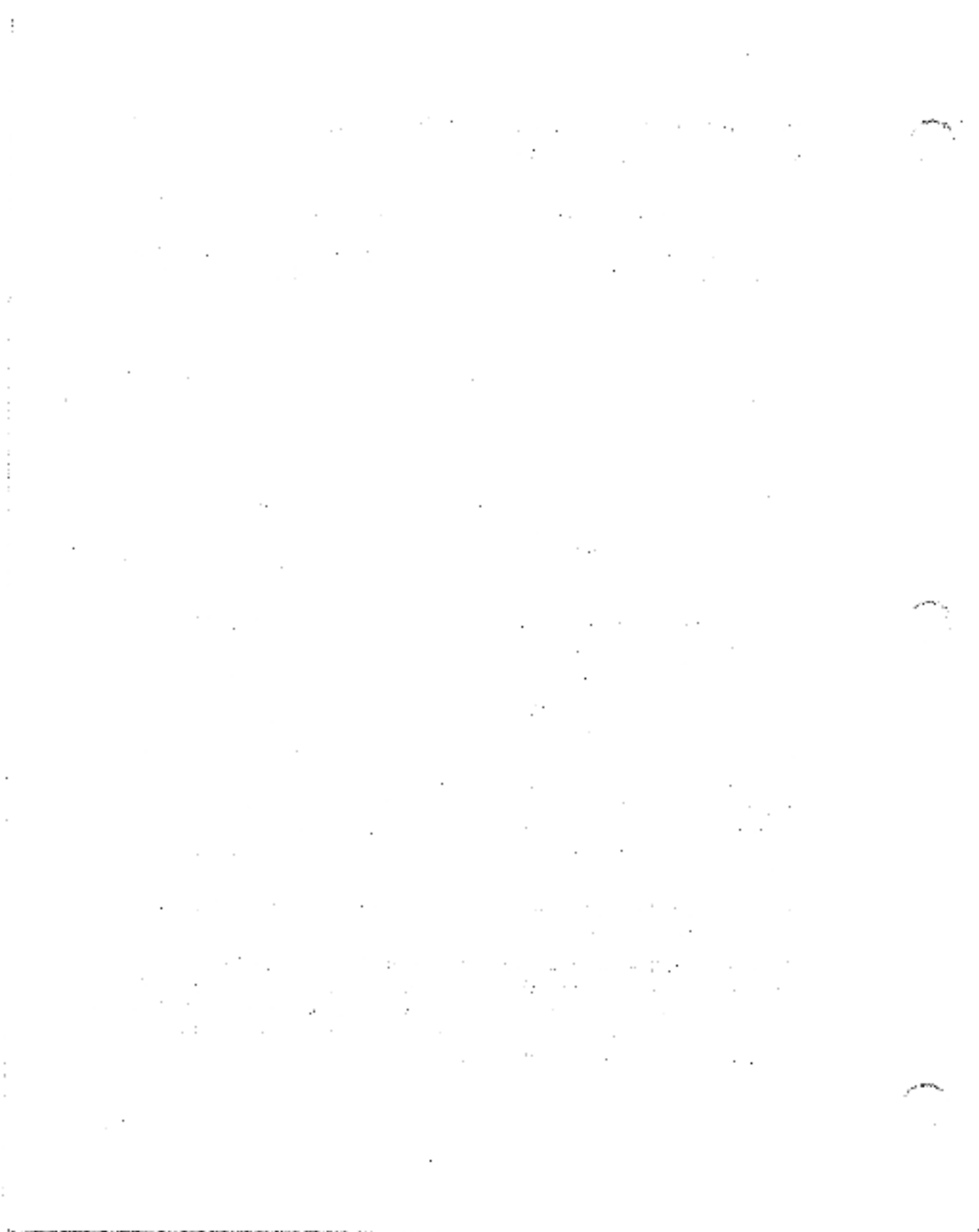
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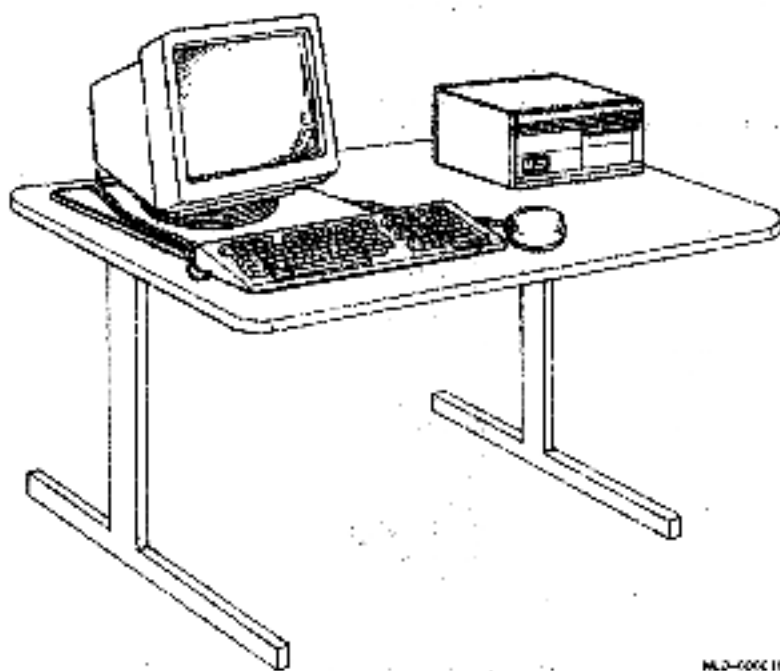
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VAXstation 2000 System Guide

Order Number EK-V2000-SG-001



ML2-00010

**digital equipment corporation
maynard, massachusetts**

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Preface

This revised manual combines the *VAXstation 2000 Hardware Installation Guide*, EK-VAXAC-IN-003 and the *VAXstation 2000 Owner's Manual*, EK-VAXAC-OM-003.

This manual describes how to connect, test, operate, and troubleshoot the VAXstation 2000 hardware. Keep this manual for reference.

Recommended Reading Path

The VAXstation 2000 hardware and software documentation should be read in the following order:

1. Hardware Information
 - a. *VAXstation 2000 System Guide*
 - b. *Workstations and MicroVAX 2000 Network Guide*
2. Operating System Installation Information
 - a. *VAXstation 2000 System Guide*, Chapter 2 (Operating the VAXstation 2000) (this manual)
 - b. *MicroVMS VAXstation 2000/MicroVAX 2000 Installation Guide*
or
ULTRIX-32w Basic Installation Guide for the VAXstation 2000
3. Reference Information
 - a. *VAXstation 2000 System Guide*
 - b. *MicroVMS VAXstation 2000/MicroVAX 2000 Operations Guide*
or
ULTRIX-32 System Management Guide and *ULTRIX-32 Programmer's Manual*

VAXstation 2000 Description

The VAXstation 2000 is a single-user stand-alone workstation using the MicroVAX II processor chip, with 2 megabytes of memory on board. Its

desktop enclosure can hold one or two storage devices. Other hardware includes:

- Your choice of one of the following monitors:

37 cm (15 in) diagonal (nominal dimension) monitors

VR150 monochrome (240 mm x 203 mm actual viewing area) with tilt-swivel base

VR160 color (240 mm x 203 mm actual viewing area) with tilt-swivel base

— 47.5 cm (19 in) diagonal (nominal dimension) monitors

VR260 monochrome (334 mm x 282 mm actual viewing area) tilt-swivel base optional

VR290 color (326 mm x 275 mm actual viewing area) with tilt-swivel base

- Ethernet controller module (preinstalled)

- ThinWire Ethernet hardware

2 Terminators

T-connector

The system unit, monitor, and keyboard can all be placed on a desktop.

The following DIGITAL hardware options are offered:

- Mouse

- Keyboard

- 4- and 8-plane graphics coprocessor

- 4- and 12-megabyte memory modules

- Expansion box for additional mass storage

- Expansion adapter to connect expansion box to system unit

- Mass storage

Fixed disk drives with 40, 71, or 140 megabytes of mass storage

Diskette drive with 1.2 megabytes of mass storage

Tape drive with 94.5 megabytes of mass storage

- Printers and Plotters

LN08, LN03-PLUS, and LN03R laser printers

LA210 and LA75 dot matrix printers
LCC01 color printer
LJ250/LJ252 color printers

- Tablet
- Modems

DF224 and DF124

The VAXstation 2000 supports either the ULTRIX or VMS operating system as follows:

- VMS
VMS workstation software
- ULTRIX
ULTRIX-32w workstation software

Layered software is also available. Consult your sales representative for information.

System Manager

A system manager should be chosen to oversee the hardware and software for single and multiple VAXstation 2000s and other systems that may be located on the same network or in a local geographical area. The system manager simplifies and centralizes the maintenance of equipment and software.

Special Notices

The following notices appear throughout this manual:

- Notes—Contain general or supplemental information about a topic.
- Cautions—Contain information to prevent damage to equipment.
- Warnings—Contain information to prevent personal injury.

Conventions Used in This Document

Convention	Meaning
Bold	Notes, cautions, and warnings are bolded. User input is also bolded.
<i>Italics</i>	Computer terms defined in the Glossary are italicized the first time the word appears in the text.

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Chapter 1

How to Connect the VAXstation 2000

You can easily set up your VAXstation 2000 by using the following step-by-step procedure. Then you can install the networking hardware and the operating system software.

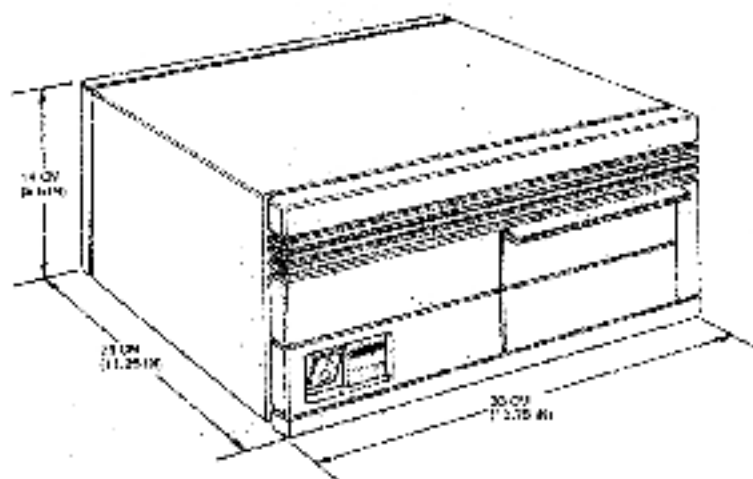
Step 1. How to Prepare the Site

The environment required for your VAXstation 2000 is the same as a comfortable environment required for people. Moderate temperatures and humidity are needed.

Space Planning

Plan for 10 cm (4 in) clearance on all sides of the VAXstation 2000 system unit and monitor to allow air circulation through the equipment. Do not block the vents.

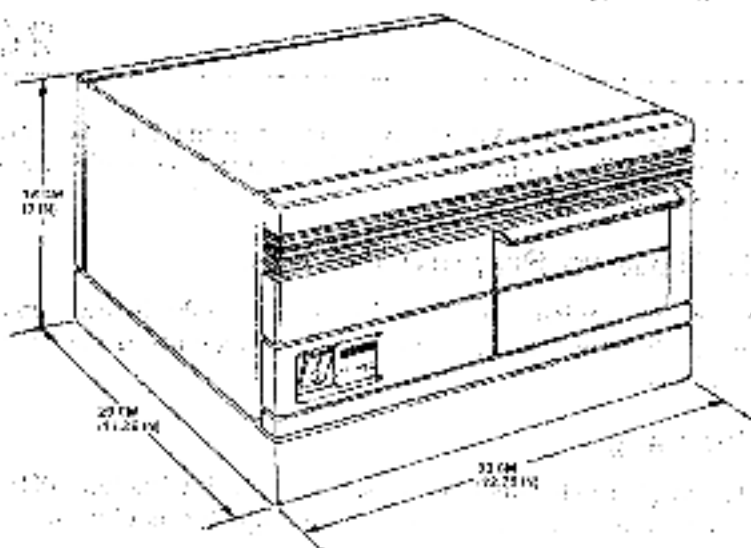
Figure 1-1: The VAXstation 2000 System Unit



MAI 000011

The VAXstation 2000 system unit with the expansion adapter (Figure 1-2) weighs about 14 kg (30 lb).

Figure 1-2: The VAXstation 2000 System Unit with the Expansion Adapter



Environmental Requirements

- Keep temperature between 15.5 and 35.5 degrees Celsius (60 and 96 degrees Fahrenheit).
- Keep the air well circulated to prevent heat from accumulating.
- Keep the VAXstation 2000 away from heaters, photocopiers, and direct sunlight.
- Keep environment between 40 and 80 percent relative humidity for proper operation of the VAXstation 2000.
- To decrease static electricity buildup, locate the system away from busy areas, such as office corridors, and keep the environment at the recommended humidity levels. (Static electricity can cause a system to fail, data to be lost, and other problems to occur.)
- Keep the area clean. Do not place food or liquid on or near the VAXstation 2000.
- Keep the area free of dust. Filter the air. (Dust particles can interfere with system cooling and damage hardware, diskettes, and tape cartridges.)
- Store supplies, such as diskettes and tape cartridges, at the same temperature and humidity levels as recommended for the system environment. (Refer to the index for more information on diskettes and tape cartridges.)

Electrical Requirements

A dedicated 15-ampere branch circuit is recommended for each system. The circuit must:

- Meet national and local standards
- Provide a good system ground
- Be stable
- Be free from electrical noise

If power disturbances cannot be prevented, add power-conditioning equipment. Some printers require branch circuits. Consult DIGITAL service personnel to assess your needs.

The ac power source should allow for system expansion. Do not connect other equipment (such as air conditioners or office copiers) to the circuit dedicated to the system unit or the monitor.

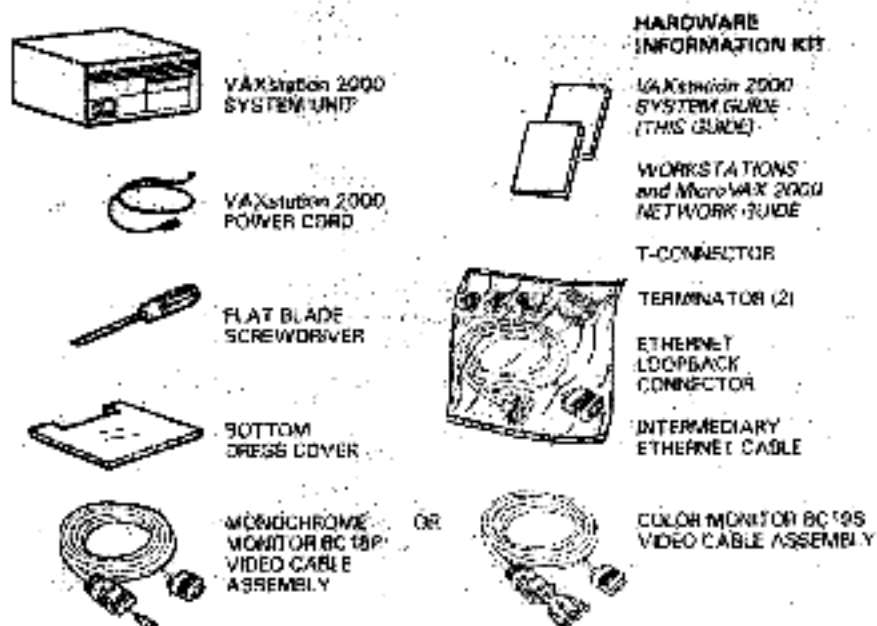
For detailed VAXstation 2000 system specifications, refer to Appendix A.

For networking information, refer to the *Workstations and MicroVAX 2000 Network Guide*.

Step 2. Check Your Shipment

You should receive two cartons: the VAXstation 2000 system unit carton and the consolidation carton. Unpack the boxes and check to see that you have received all the items in Figure 1-3 and Figure 1-4.

Figure 1-3: VAXstation 2000 System Unit Carton Contents



940-200710

Figure 1-4: VAXstation 2000 Consolidation Carton Contents



VR280
MONOCHROME
MONITOR



OR VR280
COLOR
MONITOR



OR VR150
MONOCHROME
MONITOR



OR VR150
COLOR
MONITOR



MONITOR POWER CORD



LK201 KEYBOARD



KEYBOARD FEET



VSXXX-AA MOUSE

15.0-000021

You will receive one of the monitors shown in Figure 1-4 and all the other hardware. Optional items and software are not shown.

Note: The serial number of the fixed disk is on the packing slip. You need this serial number to format the fixed disk. Keep the packing slip. The packing slip also lists all the items you have received.

Note: If you have a diskless system, you will receive an RD/RX cable with screws. Keep this cable and screws for future upgrade to a system with a disk.

Caution: Do not place the system unit or expansion boxes on their fronts, as it may damage the drive doors on the box fronts.

Use the cable-restraining bar as a handle to carry the unit.

You may have received additional items. If you ordered operating system software, it is in a separate software carton with the operating system documentation. Hardware options, such as printers, a tilt-swivel base for the 47.5 cm (19 in) monochrome monitor (VR260) (order no. VR10X-AA), the *table*, or expansion boxes, are packaged in separate boxes. Options, such as the expansion adapter and *memory module*, come preinstalled in the system unit.

If your shipment is damaged or if any item that you ordered is missing, inform the delivery agent and contact your sales representative.

Save all packing boxes in case you change locations or need to send back parts of the system for repair.

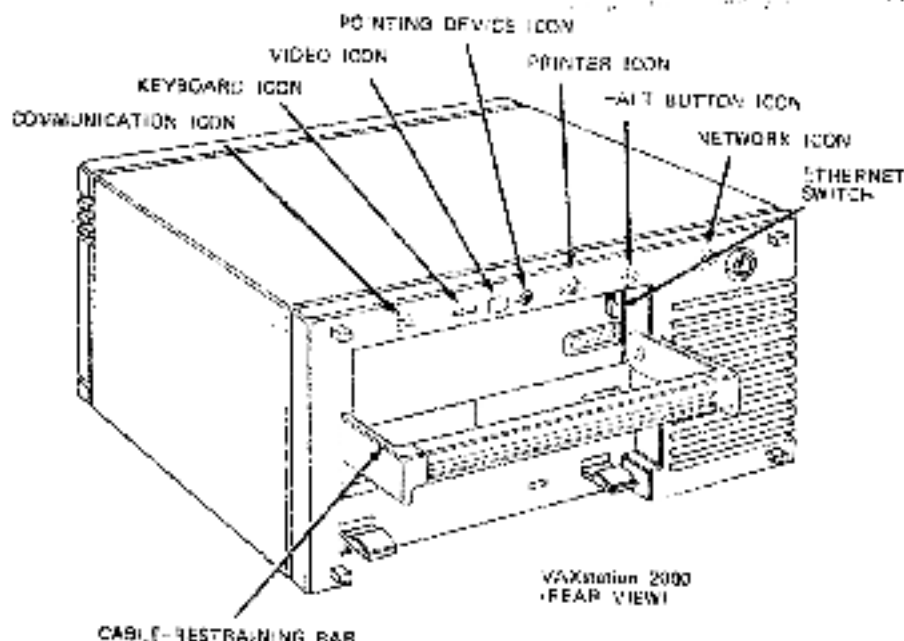
Step 3. How to Set Up the System Unit

First, look at the back of the system unit. Figure 1-5 shows the ports and connectors you will use to attach cables to the system unit. Those ports and connectors are identified by graphic symbols called *icons*.

Use the handle on the back of each system unit (Figure 1-5) to carry the unit.

Caution: Do not place the system unit or expansion boxes on their fronts, as it may damage the drive doors on the box fronts.

Figure 1-5: Rear of System Unit



ML-000015

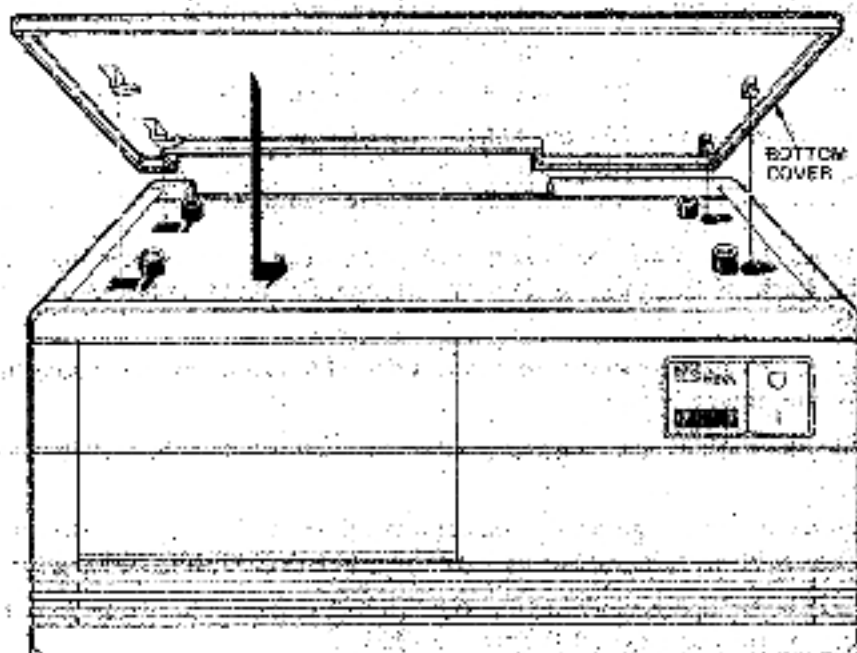
Note: To connect your VAXstation 2000 to either Thickwire or ThinWire Ethernet, see instructions in your *Workstations and MicroVAX 2000 Network Guide*.

1. You may set up the VAXstation 2000 system unit on its bottom rubber feet or on either side.

If you set up the VAXstation 2000 system unit on its side, first put on the bottom cover. Follow these steps:

- a. Place the VAXstation 2000 system unit upside down on a level surface.
- b. Locate the bottom cover.
- c. Line up the molded inserts on the inside of the bottom cover over the holes on the bottom of the VAXstation 2000 system unit. Then slide the bottom cover until it locks into place (Figure 1-6).

Figure 1-6: Bottom Cover on System Unit



WIC-000014

2. Place the VAXstation 2000 system unit in either of the recommended positions on a level surface. (All the illustrations in this guide show the VAXstation 2000 system unit positioned on its feet. If you wish to position the system unit on its side, follow the text and use the illustrations for cabling installation reference.)

Step 4. How to Connect the Monitor Cable to the System Unit

You can attach a monochrome, a monochrome with *gray-scale*, or a color monitor to your VAXstation 2000 system unit. Table 1-1 shows the available monitors and the required monitor cables.

Table 1-1: Monitor Types

Monitor	Size	Type	Cable Needed
VR150	24 cm (15 in)	monochrome	BC18P
VR150 with gray-scale	24 cm (15 in)	monochrome	BC19S
VR160	24 cm (15 in)	color	BC19S
VR260	33.4 cm (19 in)	monochrome	BC18P
VR260 with gray-scale	33.4 cm (19 in)	monochrome	BC19S
VR290	32.6 cm (19 in)	color	BC19S

Caution: Do not place the system unit on its front when connecting cables to the back of the unit, as it may damage the drive doors on the box fronts.

Caution: Do not disconnect or connect the video cable to the system unit while the power is on.

1. Lift the cable-restraining bar on the rear of the VAXstation 2000 system unit.

Note: If you are going to connect the printer and modem cables, leave the cable-restraining bar up until you have connected those options.

2. Locate the appropriate video cable assembly shown in Figure 1-7 (part no. BC18P) or Figure 1-8 (part no. BC19S).

Figure 1-7: Video Cable Assembly, BC18P

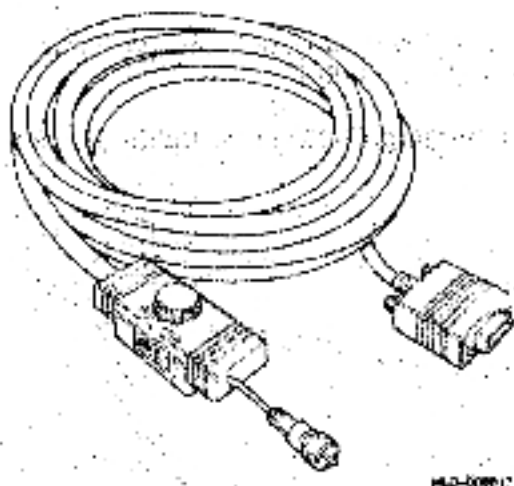
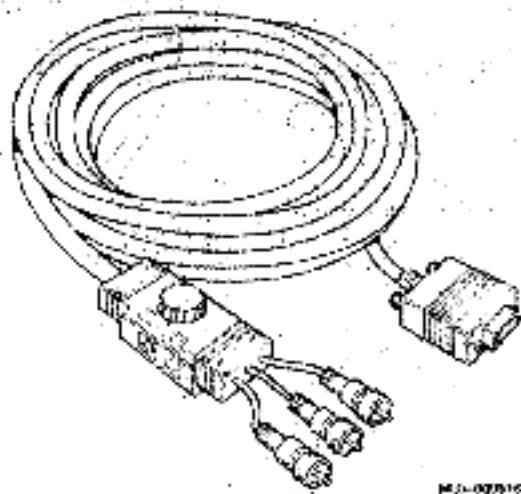
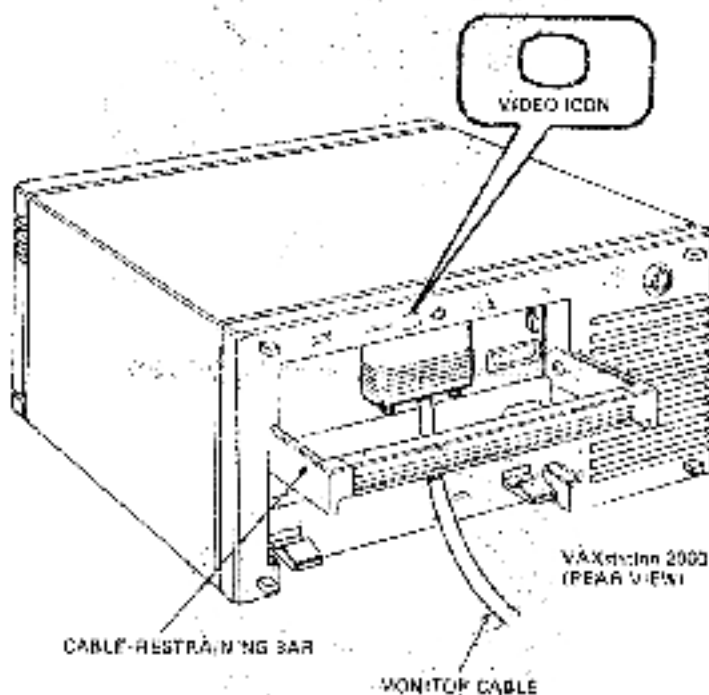


Figure 1-8: Color Video Cable Assembly, BC19S



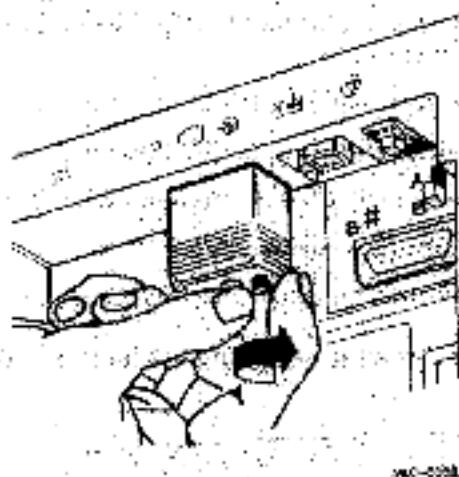
3. Connect the end of the appropriate video cable to the video port on the rear of the VAXstation 2000 system unit. The video port is marked with a video icon.
4. Insert the monitor video cable with the video-icon side of the monitor cable facing you (Figure 1-9).

Figure 1-9: Connecting the Monitor Cable to the System Unit



5. Tighten the thumbscrews on the monitor video cable by turning them clockwise with your fingers (Figure 1-10). Do not use a screwdriver.

Figure 1-10: Tightening the Thumbscrews on the Monitor Cable



Step 5: How to Set Up the Small Monochrome Monitor (VR150)

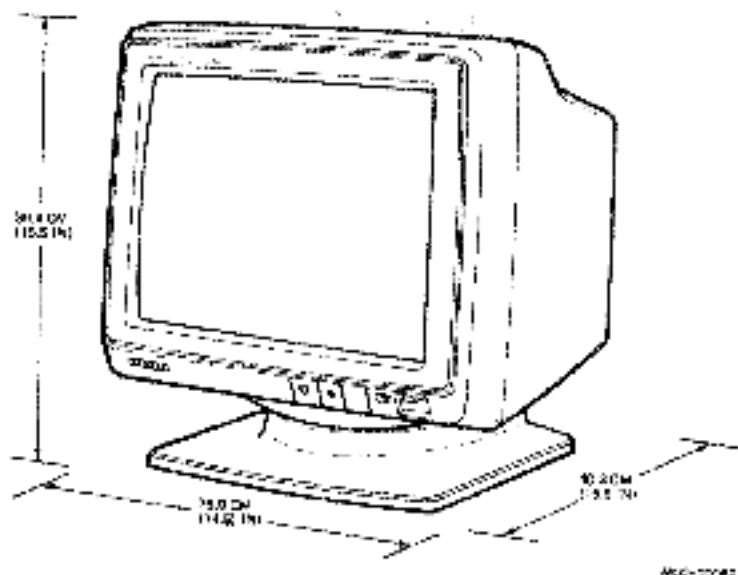
The small monochrome monitor can be used in two ways, as a black and white monitor or as a gray-scale monitor (using a 4- or 8-plane color graphic board option). This section has instructions for setting up both. The small monochrome monitor has an actual viewing area of 24 cm x 20.3 cm (15 in diagonal, nominal dimension).

Steps 5, 6, and 7 are repeated for each of the four available monitors.

- Step 5 for the small color monitor (VR160) on page 1-25
- Step 5 for the large monochrome monitor (VR260) on page 1-33
- Step 5 for the large color monitor (VR290) on page 1-49

After you set up your monitor, go to Step 8 on page 1-58.

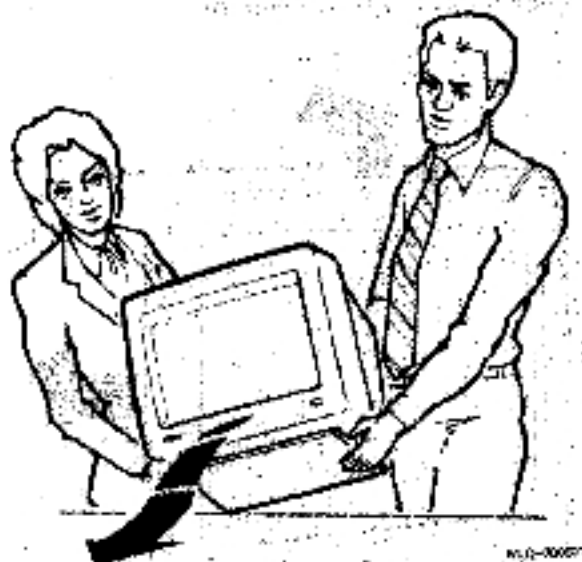
Figure 1-11: The Small Monochrome Monitor (VR150)



Place the monitor on a level surface near the VAXstation 2000 system unit (Figure 1-12).

Caution: This procedure requires two people. The monitor weighs 16.34 kg (36 lb).

Figure 1-12: Setting the VR150 on a Level Surface

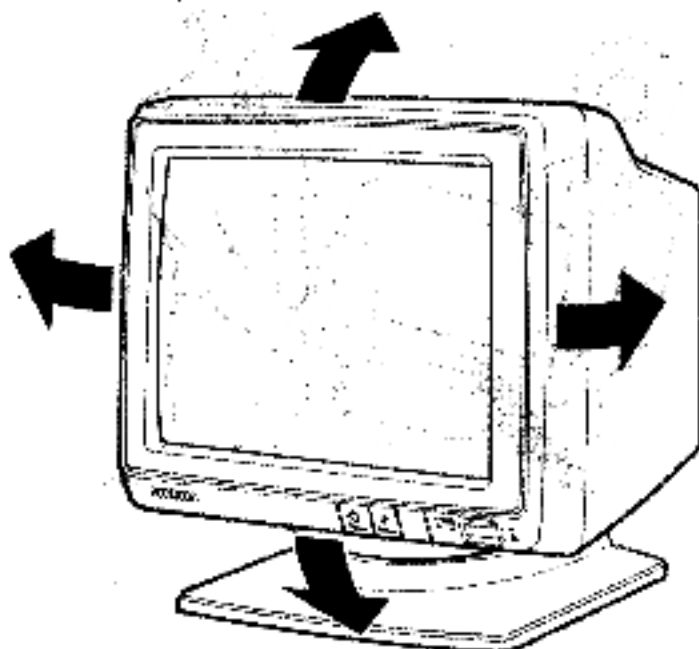


How to Adjust the Tilt of the Monitor

Caution: The monitor does not swivel in a complete circle. If you try to swivel the monitor in a complete circle, you may damage the base.

To set the angle, tilt the monitor forward or backward to the desired position. You can swivel the monitor about its base and still maintain the tilt angle (Figure 1-13).

Figure 1-13: Adjusting Tilt, VR150 Monitor



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How to Connect the Video Cable Assembly to the Small Monochrome Monitor (VR150)

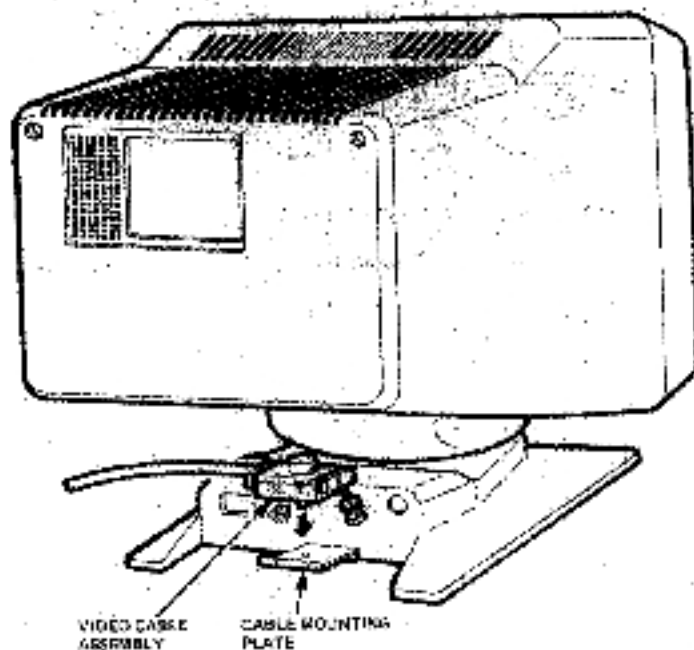
If you have a small monochrome monitor (VR150) with a 4-plane graphics coprocessor for gray-scale display on your screen, you need to connect a color video cable assembly to your monitor. Follow the instructions for the small monochrome monitor with color cable to use the 4-plane graphics coprocessor with your monochrome monitor.

Connecting the Small Monochrome Monitor (VR150) without Gray-scale

1. Screw the video cable assembly into the cable mounting plate (Figure 1-14).

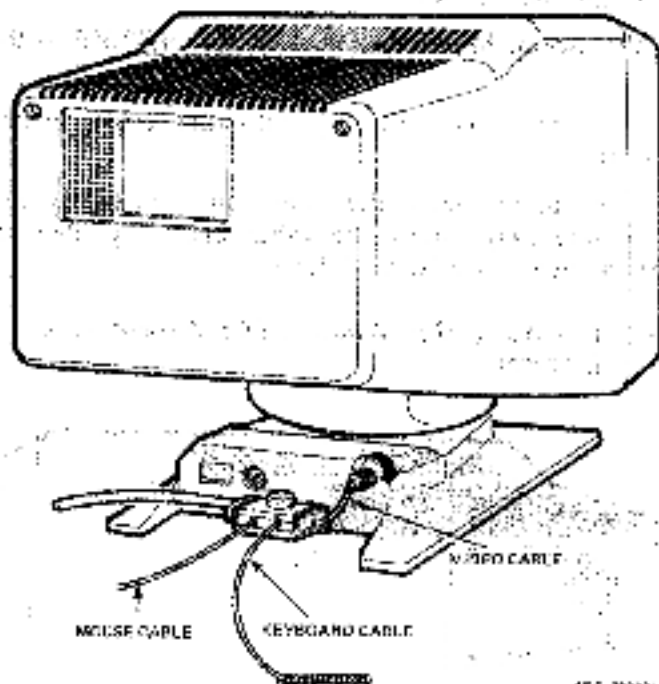
Caution: Failure to secure the video cable assembly to the cable mounting plate may strain the cable and may also cause radio emissions in excess of FCC guidelines.

Figure 1-14: Mounting the Video Cable Assembly on the Small Monitor



2. Connect the video cable to the monitor connector on the rear panel.
3. Push the cable in and turn the connector clockwise to lock it in place (Figure 1-15).

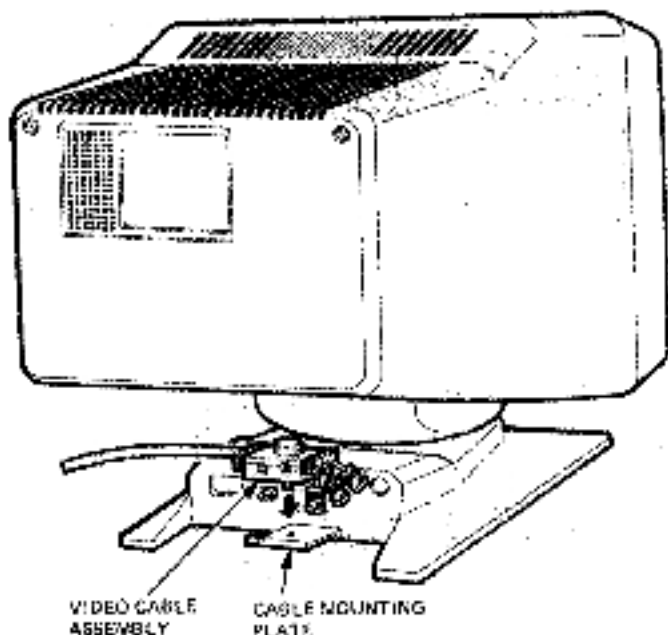
Figure 1-15: Connecting the Video Cable, Small Monitor



Connecting the Small Monochrome Monitor (VR150) with Gray-scale

1. Locate the shorter knob of the two knobs that comes with the color video cable.
2. Screw the video cable assembly into the cable mounting plate (Figure 1-16).

Figure 1-16: Mounting Video Cable Assembly on Small Monitor, Color Cable



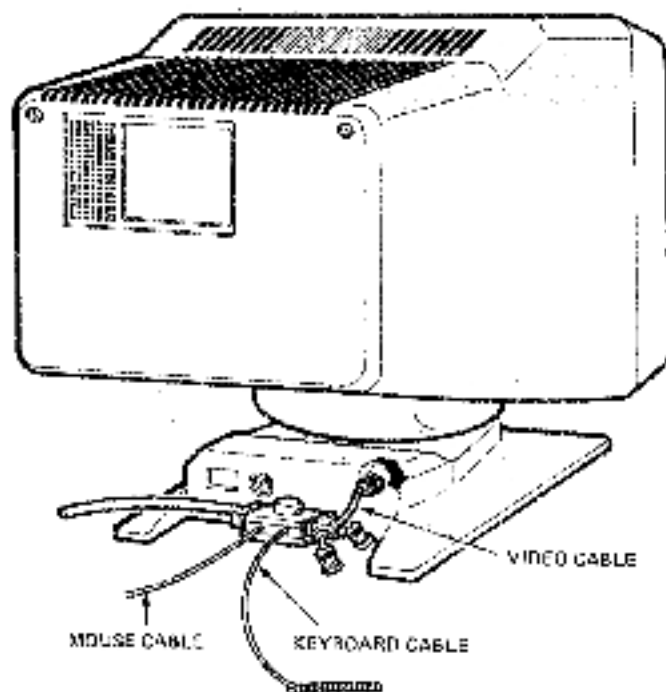
101 11-000000

Caution: Failure to secure the video cable assembly to the cable mounting plate may strain the cable and may also cause radio emissions in excess of FCC guidelines.

3. Connect ONLY the G video cable to the monitor connector on the rear panel (Figure 1-17).
4. Push the cable in and turn the connector clockwise to lock it in place.

Note: The R and B connectors will hang freely—do not connect them to anything.

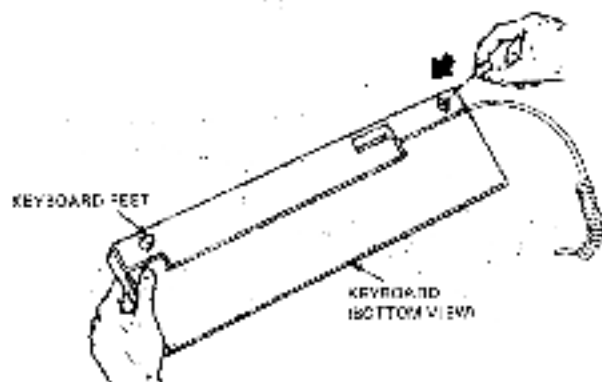
Figure 1-17: Connecting G Cable Connector; Small Monitor (VR150)



Step 6. How to Connect the Keyboard to the Small Monochrome Monitor

1. Locate the keyboard.
2. Turn over the keyboard and push in the keyboard feet (Figure 1-18). Installation of the keyboard feet is optional.

Figure 1-18: Connecting the Keyboard Feet, Small Monochrome Monitor



NO 11-18800-01

3. Turn the keyboard right side up.

Caution: Do not disconnect or connect the pointing device cable while the system power is on.

4. Connect the keyboard cable and pointing device cable to the appropriate video cable assembly (Figure 1-19 or Figure 1-20).

Figure 1-19: Pointing Device and Keyboard Connection, Small Monitor (VR150)

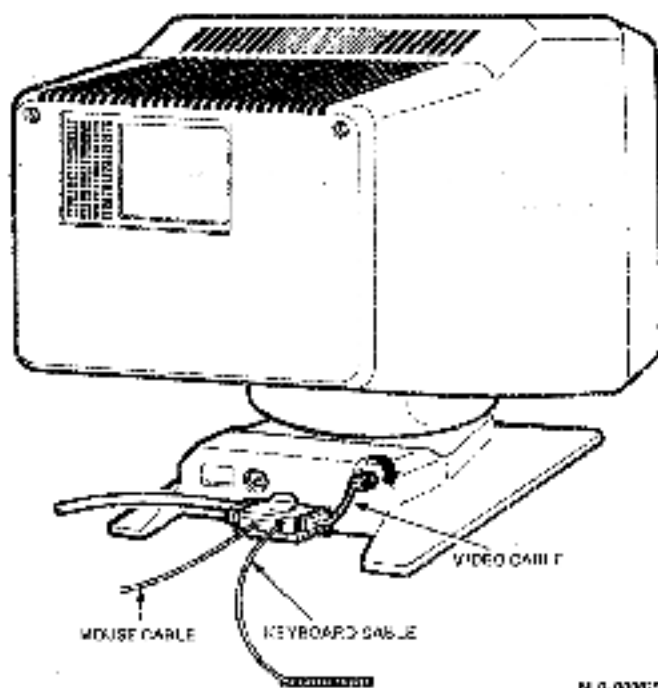
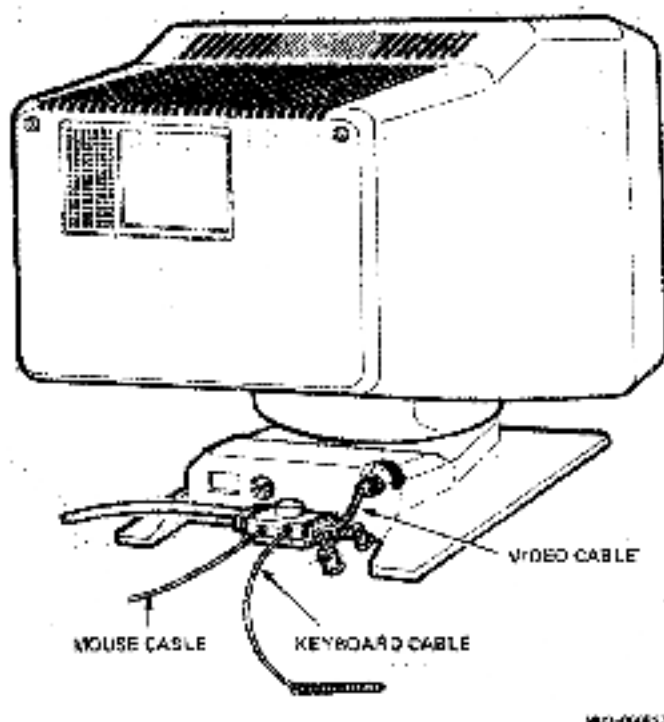


Figure 1-20: Pointing Device and Keyboard Connection, Small Monitor with Color Cable

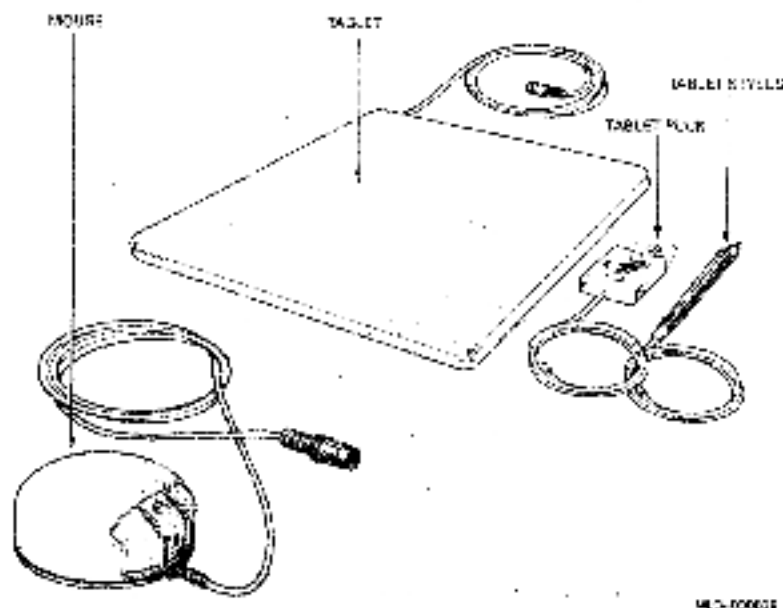


If you have no options to connect, proceed to the section on How to Connect the Power Cords.

Step 7. How to Connect the Pointing Device to the Small Monochrome Monitor (VR150)

Locate the *pointing device* you wish to use, which may be either a *mouse* (standard) or a *tablet* (optional) (Figure 1-21). The mouse and the tablet cannot be used at the same time.

Figure 1-21: Mouse and Tablet, Small Monochrome Monitor



If you are connecting a tablet, attach the *puck* or *stylus* to the tablet before connecting the tablet to the VAXstation 2000. The instructions that come with the tablet explain how to connect those components.

Caution: Do not disconnect or connect the pointing device cable while the system power is on.

Note: To switch the tablet's *puck* and *stylus*, first disconnect the tablet from the VAXstation 2000, then swap the *puck* or *stylus*, and reconnect the tablet to the system.

Step 5. How to Set Up the Small Color Monitor (VR160)

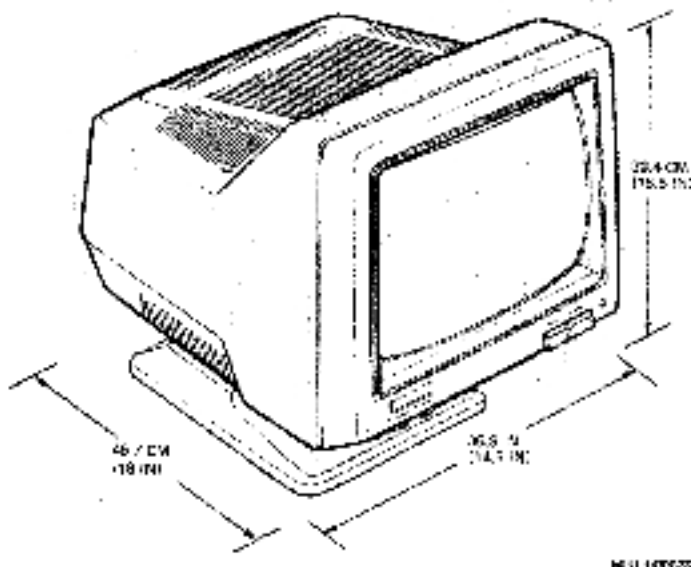
The small color monitor has an actual viewing area of 24 cm x 20.3 cm (15 in diagonal, nominal dimension).

Steps 5, 6, and 7 are repeated for each of the four available monitors.

- Step 5 for the small monochrome monitor (VR150) on page 1-14
- Step 5 for the large monochrome monitor (VR260) on page 1-33
- Step 5 for the large color monitor (VR290) on page 1-49

After you set up your monitor, go to Step 8 on page 1-58.

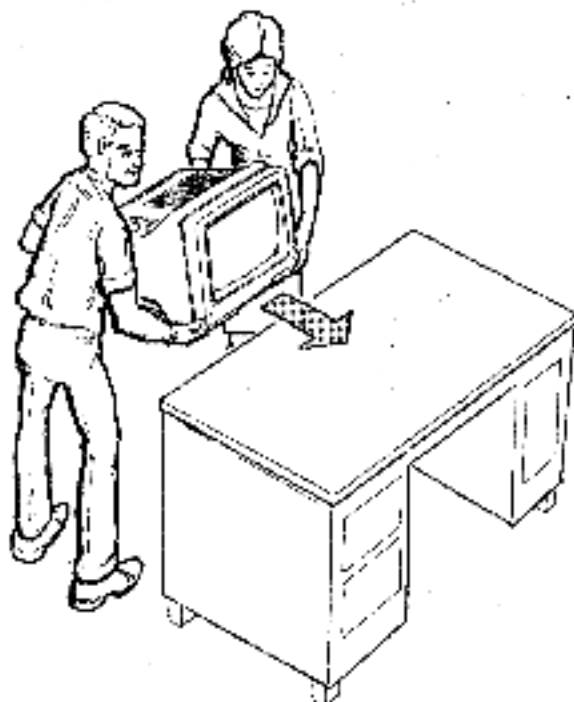
Figure 1-22: The VR160 Color Monitor



Place the monitor on a level surface near the VAXstation 2000 system unit (Figure 1-23).

Caution: This procedure requires two people. The monitor weighs 23 kg (51 lb).

Figure 1-23: Setting the Small Color Monitor (VR160) on a Level Surface



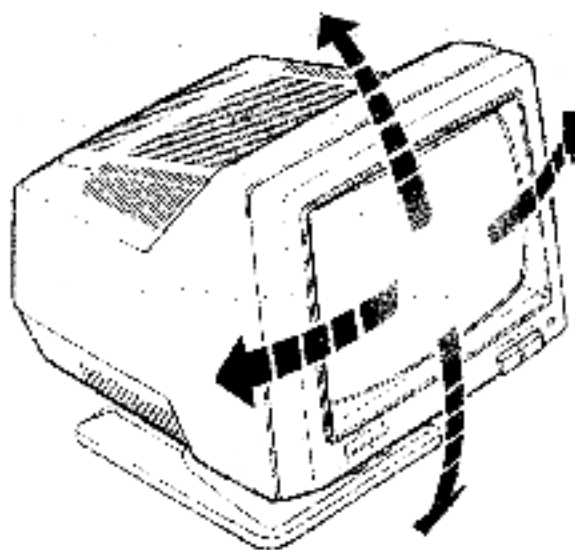
WEC-00001

How to Adjust the Tilt of the VR160 Monitor

Caution: The monitor does not swivel in a complete circle. If you try to swivel the monitor in a complete circle, you may damage the base.

To set the angle, tilt the monitor forward or backward to the desired position. You can swivel the monitor about its base and still maintain the tilt angle (Figure 1-24).

Figure 1-24: Adjusting Tilt, VR160 Monitor



160-000332

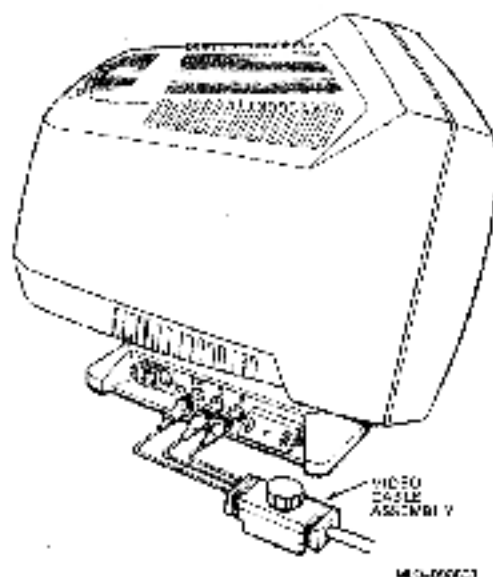
How to Connect the Video Cable Assembly to the Small Color Monitor (VR160)

1. Face the rear of the monitor.
2. Swivel the monitor all the way to the left to access the signal cable connectors.
3. Locate the signal cable connectors on the monitor.
4. Connect the signal cables to the monitor (Figure 1-25) in the following order.

Note: Push each cable in and turn each connector clockwise until it clicks and locks in place.

- a. Connect the blue signal cable to the connector labeled B.
- b. Connect the green signal cable to the connector labeled G.
- c. Connect the red signal cable to the connector labeled R.

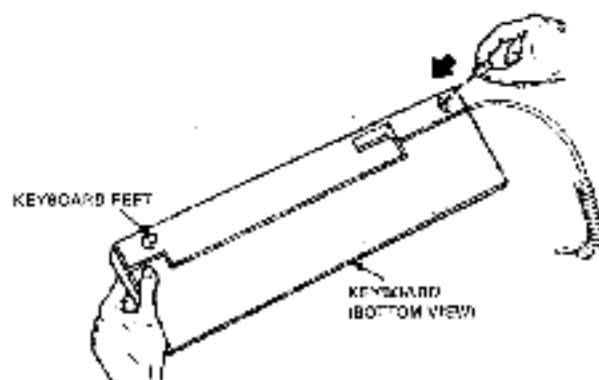
Figure 1-25: Connecting R, G, and B Signal Cables, VR160 Color Monitor



Step 6. How to Connect the Keyboard to the Small Color Monitor (VR160)

1. Locate the keyboard.
2. Turn over the keyboard and push in the keyboard feet (figure 1-26). Installation of the keyboard feet is optional.

Figure 1-26: Connecting the Keyboard Feet, VR160 Color Monitor



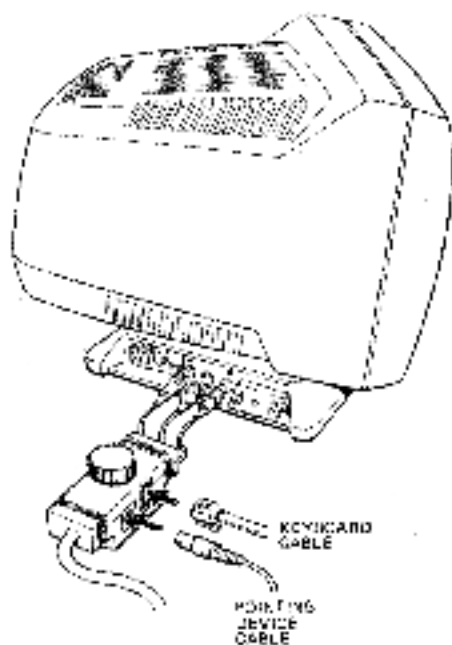
NO 11-148802X

3. Turn the keyboard right side up.

Caution: Do not disconnect or connect the pointing device cable while the system power is on.

4. Connect the keyboard cable and the pointing device cable to the video cable assembly (figure 1-27). The socket is marked with a keyboard icon and pointing device icon.

Figure 1-27: Connecting the Keyboard Cable and Pointing Device

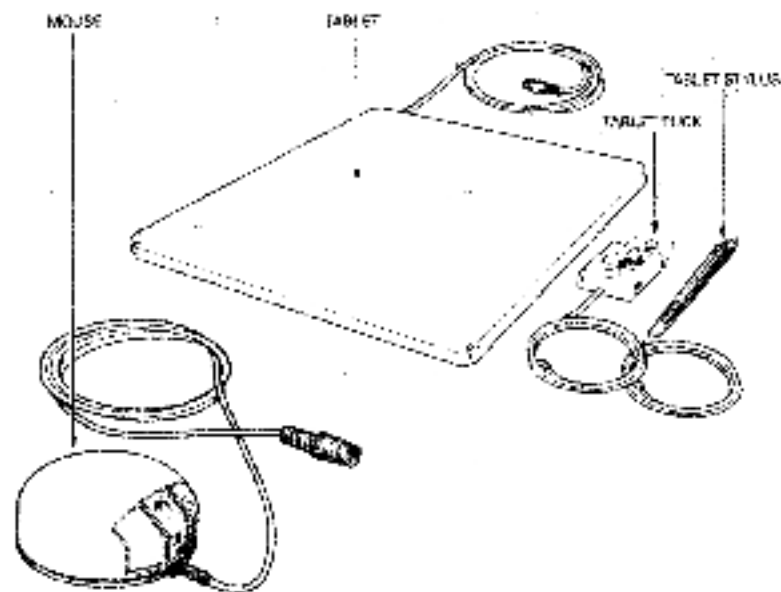


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Step 7. How to Connect the Pointing Device to the Small Color Monitor (VR160)

1. Locate the pointing device you wish to use, either a mouse (standard) or a tablet (optional) (Figure 1-28). The mouse and the tablet cannot be used at the same time.

Figure 1-28: Mouse and Tablet, VR160 Color Monitor



2. If you are connecting a tablet, attach the puck or stylus to the tablet before connecting the tablet to the VAXstation 2000. The instructions that come with the tablet explain how to connect those components.

Caution: Do not disconnect or connect the pointing device cable while the system power is on.

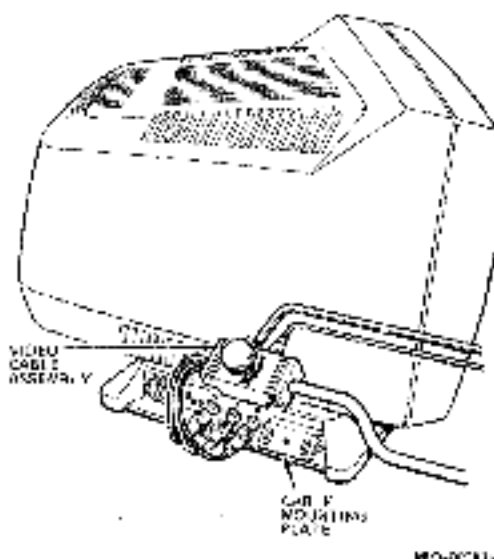
Note: To switch the tablet's puck and stylus, first disconnect the tablet from the VAXstation 2000, then swap the puck or stylus, and reconnect the tablet to the system.

How to Connect the Video Cable Assembly to the Small Color Monitor (VR160)

1. Locate the shorter knob of the two knobs that comes with the color video cable.
2. Screw the video cable assembly into the cable mounting plate.
3. Turn the knob until it is tight (figure 1-29).
4. Make sure the video cable assembly is flat against the cable mounting plate when you start and finish securing the cable to the monitor.

Caution: Failure to secure the video cable assembly screw to the cable mounting plate may strain the cable and may also cause radio emissions in excess of FCC guidelines.

Figure 1-29: Mounting Video Cable Assembly Cable on VR160 Monitor



Note: The voltage level on the color monitor is set at the factory; therefore, you do not need to reset it.

Step 5. How to Set Up the Large Monochrome Monitor (VR260)

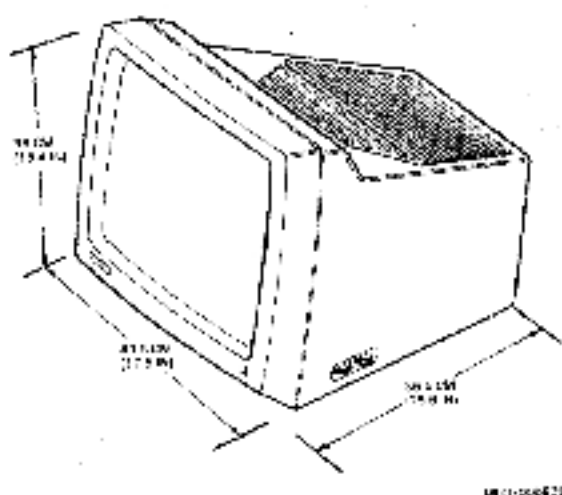
The large monochrome monitor can be used in two ways, as a black and white monitor or as a gray-scale monitor (using a 4- or 8-plane color graphic board option). This section has instructions for setting up both. The large monochrome monitor has an actual viewing area of 33.4 cm x 28.2 cm (19 in diagonal, nominal dimension).

Steps 5, 6, and 7 are repeated for each of the four available monitors.

- Step 5 for the small monochrome monitor (VR150) on page 1-14
- Step 5 for the small color monitor (VR160) on page 1-25
- Step 5 for the large color monitor (VR290) on page 1-49

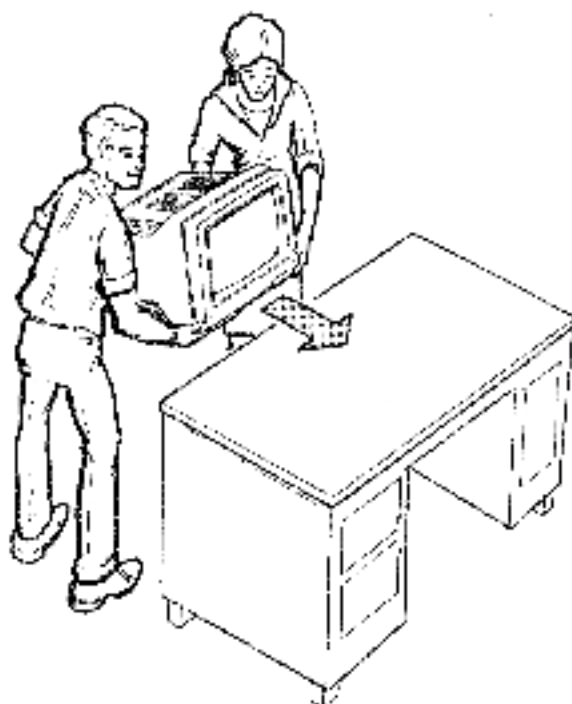
After you set up your monitor, go to Step 8 on page 1-58.

Figure 1-30: The VR260 Monochrome Monitor



Caution: This procedure requires two people. The monitor weighs 18 kg (40 lb).

Figure 1-31: Setting the VR260 on a Level Surface



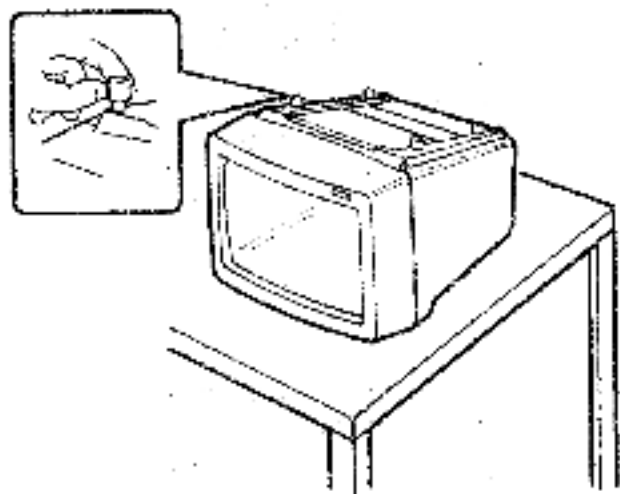
ARC-00000

1. Locate the large monochrome monitor.
2. To set up the monitor without the tilt-swivel base, place the monitor right side up on a level surface near the VAXstation 2000 system unit.

If you have an optional tilt-swivel base for the monitor, follow these steps:

- a. Place the monitor upside down on a level surface.
- b. Loosen the monitor feet by turning them counterclockwise (Figure 1-32).

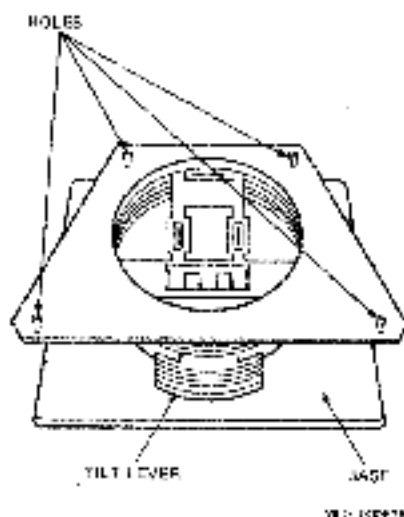
Figure 1-32: Connecting Tilt-swivel Base, VR260 Monochrome Monitor



NO. 11-100001-1

- c. Locate the tilt-swivel base (Figure 1-33).

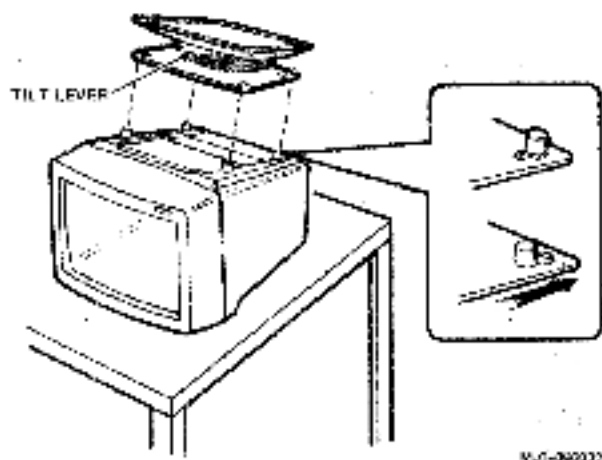
Figure 1-33: Tilt-swivel Base, VR260 Monochrome Monitor



- d. Position the tilt-swivel base over the monitor with the tilt lever on the front (screen) side of the monitor.
- e. Lower the base so that the four monitor feet go into the corresponding holes on the base.

- i. Pull the base toward the back of the system until the base slides and locks in place (Figure 1-34).

Figure 1-34: Locking Tilt-swivel Base in Place, VR260 Monochrome Monitor



- g. Tighten the monitor feet.
- h. Place the monitor right side up on a level surface near the VAXstation 2000.
- i. To adjust the tilt of the monitor, press down on the tilt lever and move the monitor to the desired angle. The monitor locks into place when you take your hand off the tilt lever (figure 1-35).

Figure 1-35: Adjusting Tilt, VR260 Monochrome Monitor

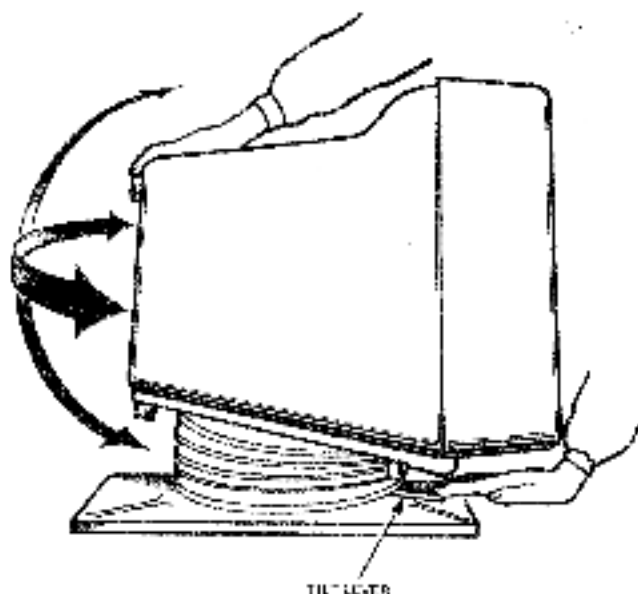


FIG. 002240

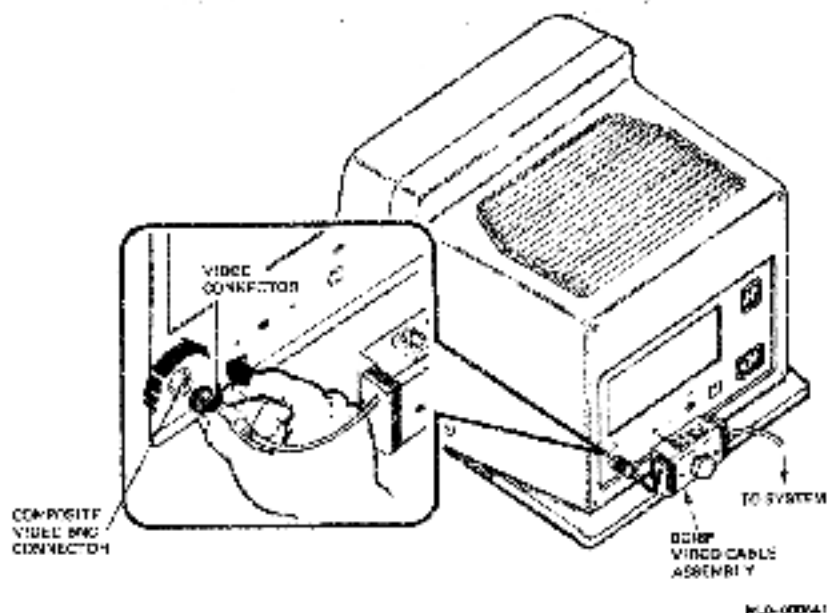
How to Connect the Video Cable Assembly to the Large Monochrome Monitor (VR260)

If you have a large monochrome monitor (VR260) with a 4-plane graphics coprocessor to display gray-scale on your screen, you will need to connect a color video cable assembly to your large monochrome monitor. Follow the instructions in the section, Large Monochrome Monitor with 4-plane Graphics Coprocessor to connect the color video cable assembly on your monochrome monitor.

How to Connect the Video Cable Assembly to the Large Monochrome Monitor (VR260) Without 4-plane Graphics Coprocessor

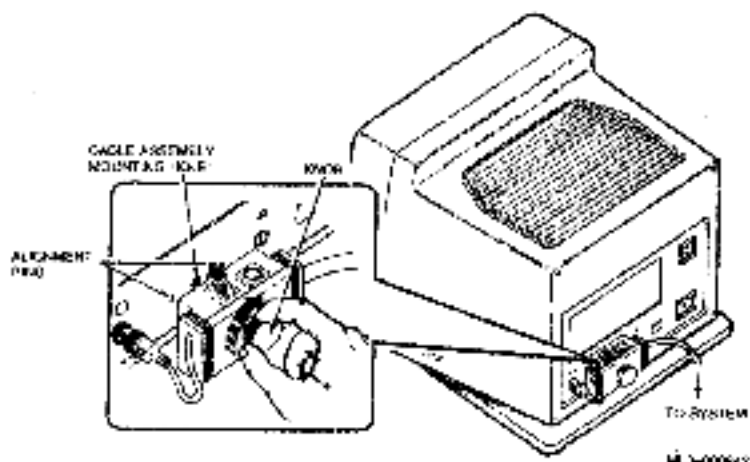
1. Insert the monitor connector into the socket on the back of the monitor. Turn the connector clockwise to fasten (Figure 1-36).

Figure 1-36: Fastening the Monitor Connector, VR260 Monochrome Monitor



2. Insert the pins and the knob of the video cable assembly into the holes to the right of the monitor connector on the rear of the monitor. Turn the knob clockwise to screw in the video cable assembly (Figure 1-37).

Figure 1-37: Connecting the Video Cable Assembly to VR260 Monochrome Monitor

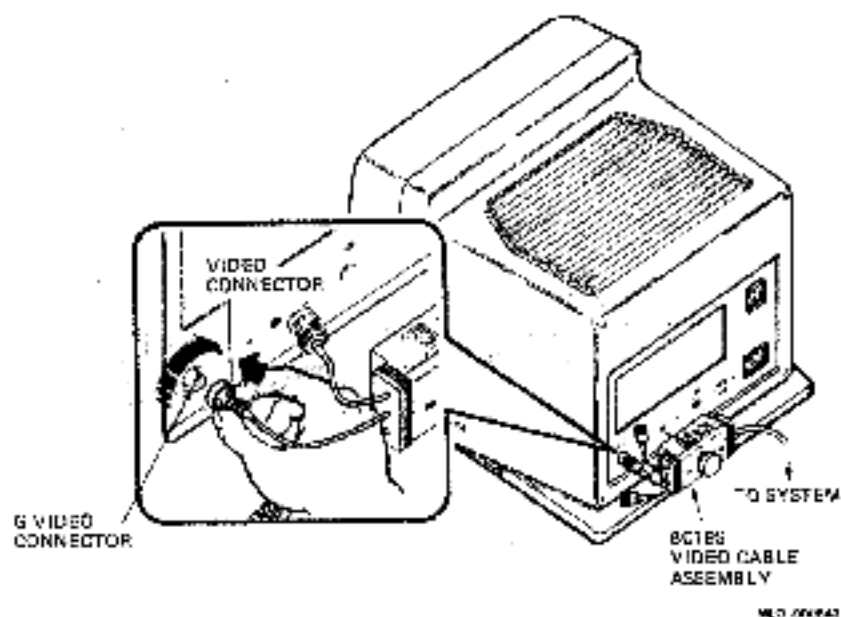


Large Monochrome Monitor (VR260) with 4-plane Graphics Coprocessor

1. Insert **ONLY** the G video cable connector of the color video cable assembly (BC19S) into the socket on the back of the monitor (Figure 1-38).
2. Turn the connector clockwise to fasten.

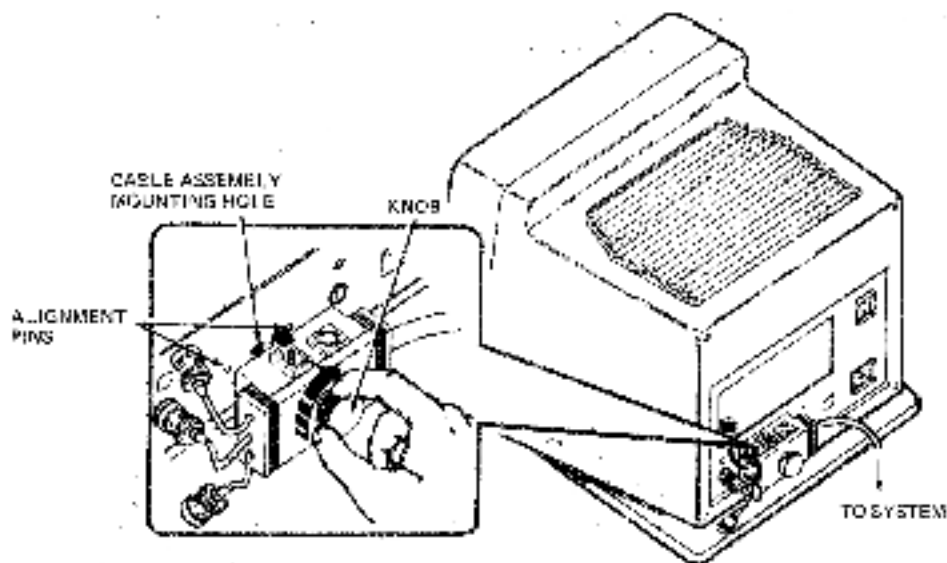
Note: The R and B connectors will hang freely—do not connect them to anything.

Figure 1-38: Connecting G Cable Connector of the Color Cable, VR260 Monochrome Monitor



3. Locate the shorter knob of the two knobs that come with the color video cable.
4. Insert the knob into the color video cable assembly.
5. Turn the knob (Figure 1-39) on the video cable assembly clockwise to secure it to the monitor.

Figure 1-39: Video Cable Assembly Knob

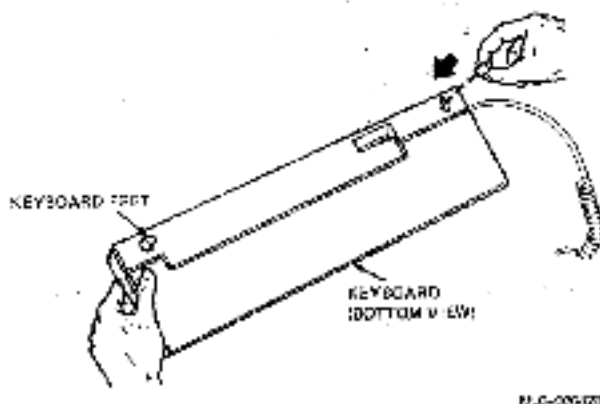


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Step 6. How to Connect the Keyboard to the Large Monochrome Monitor (VR260)

1. Locate the keyboard.
2. Turn over the keyboard and push in the keyboard feet (Figure 1-40). Installation of the keyboard feet is optional.

Figure 1-40: Connecting the Keyboard Feet, VR260 Monochrome Monitor



3. Turn the keyboard right side up.

Caution: Do not disconnect or connect the keyboard cable while the system power is on.

4. Connect the free end of the keyboard cable to the appropriate video cable assembly on the rear of the monitor (Figure 1-41 or Figure 1-42). The socket is marked with a keyboard icon.

Figure 1-41: Keyboard Connection, VR260 Monochrome Monitor

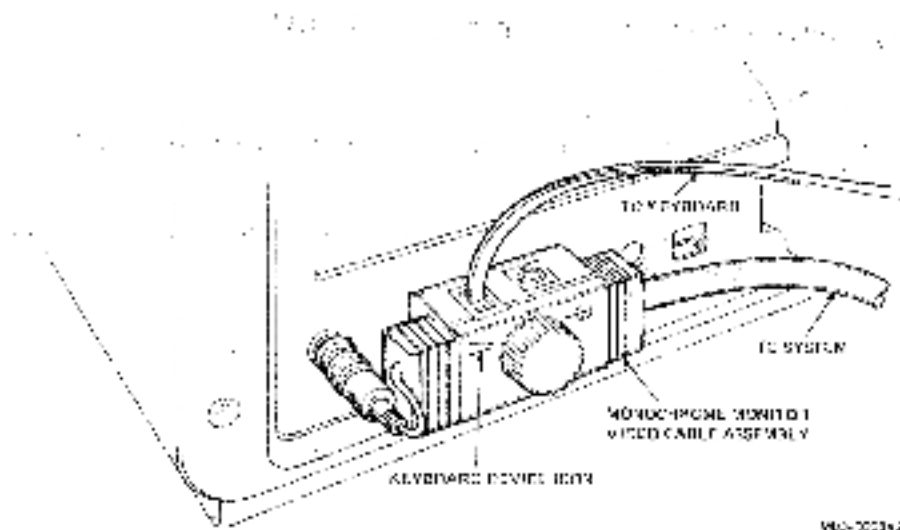
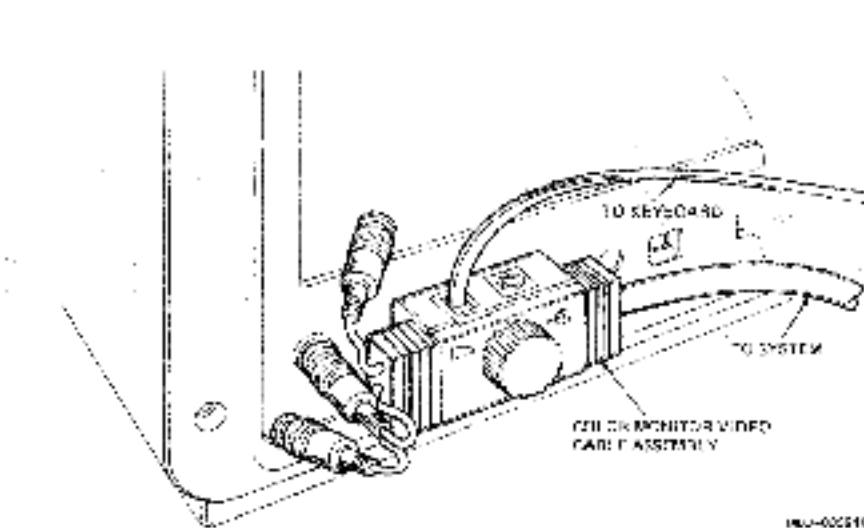


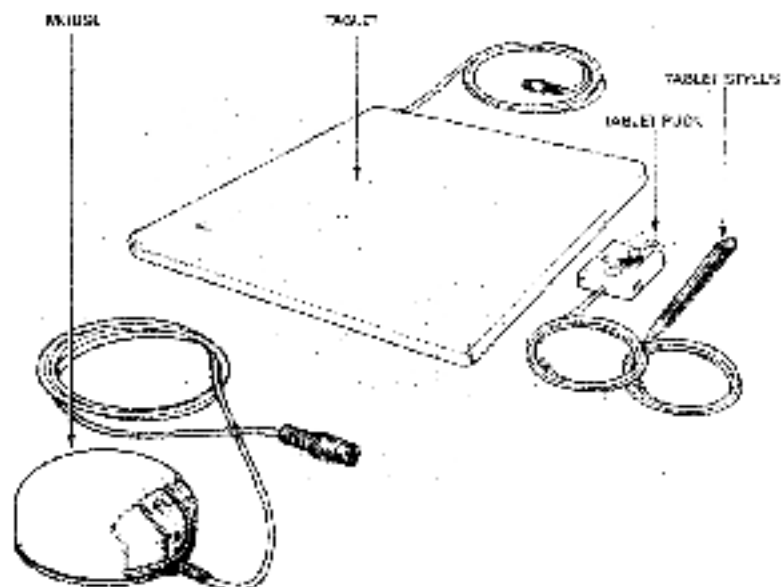
Figure 1-42: Keyboard Connection, VR260 Monochrome Monitor and Color Cable



Step 7. How to Connect the Pointing Device to the Large Monochrome Monitor (VR260)

1. Locate the pointing device you wish to use, which may be either a mouse (standard) or a tablet (optional) (Figure 1-43). The mouse and the tablet cannot be used at the same time.

Figure 1-43: Mouse and Tablet, VR260 Monochrome Monitor



2. If you are connecting a tablet, attach the puck or stylus to the tablet before connecting the tablet to the VAXstation 2000. The instructions that come with the tablet explain how to connect those components.

Note: To switch the tablet's puck and stylus, first disconnect the tablet from the VAXstation 2000, then swap the puck or stylus, and reconnect the tablet to the system.

- Caution:** Do not disconnect or connect the pointing device cable to the monitor while the system power is on.
3. Push the free end of the pointing device cable into the socket marked with a pointing device icon. (Figure 1-44 or Figure 1-45).

Figure 1-44: Pointing Device Connection. VR260 Monochrome Monitor

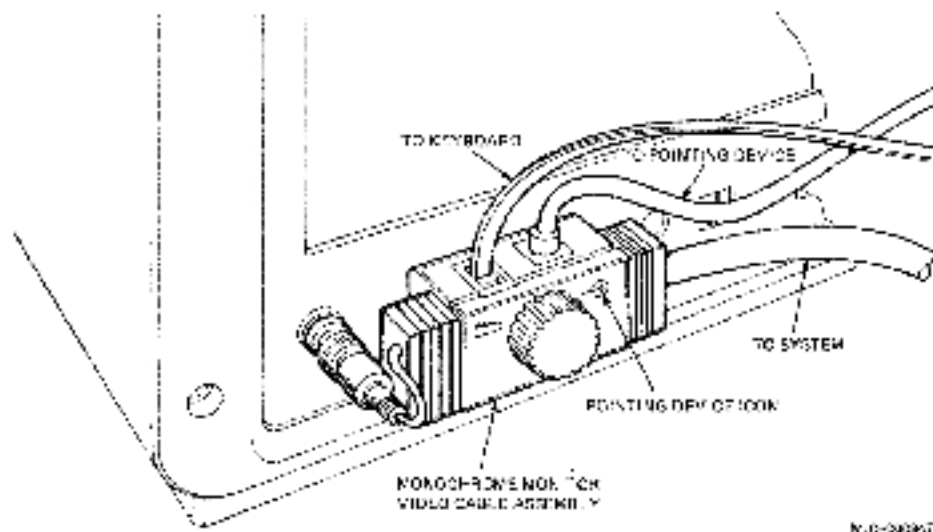
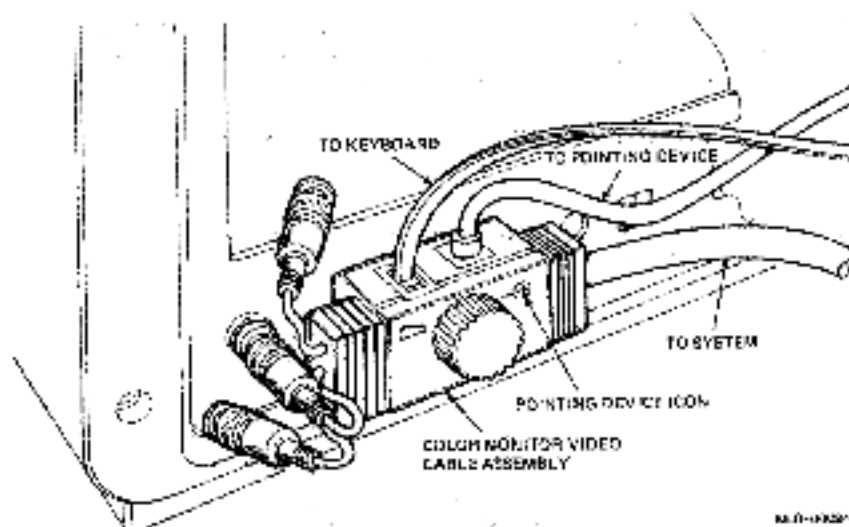


Figure 1-45: Pointing Device Connection, VR260 Monochrome Monitor with Color Cable



Step 5. How to Set Up the Large Color Monitor (VR290)

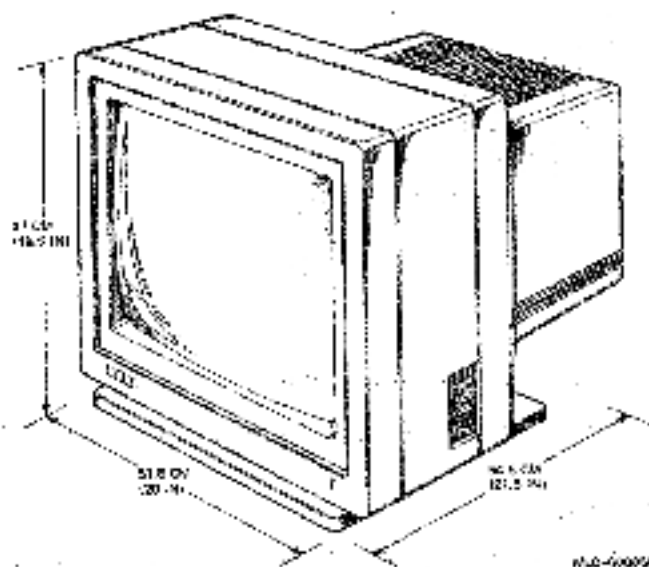
The large color monitor has an actual viewing area of 32.6 cm x 27.5 cm (19 in diagonal, nominal dimensions).

Steps 5, 6, and 7 are repeated for each of the four available monitors.

- Step 5 for the small monochrome monitor (VR150) on page 1-14
- Step 5 for the small color monitor (VR160) on page 1-23
- Step 5 for the large monochrome monitor (VR260) on page 1-33

After you set up your monitor, go to Step 8 on page 1-58.

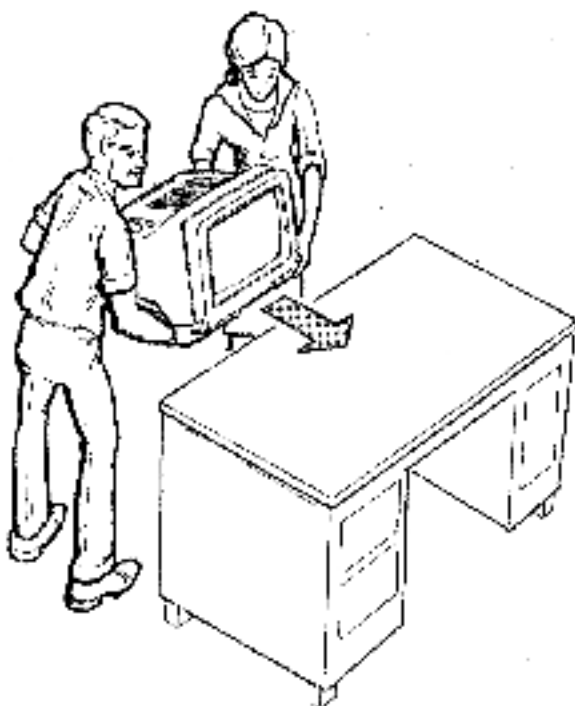
Figure 1-47: The VR290 Color Monitor



Note: The electromagnetism from your monitor may damage diskettes by distorting or erasing the magnetic patterns. Do not place any magnetic media on or near your monitor.

Caution: This procedure requires two people. The monitor weighs 36 kg (80 lb).

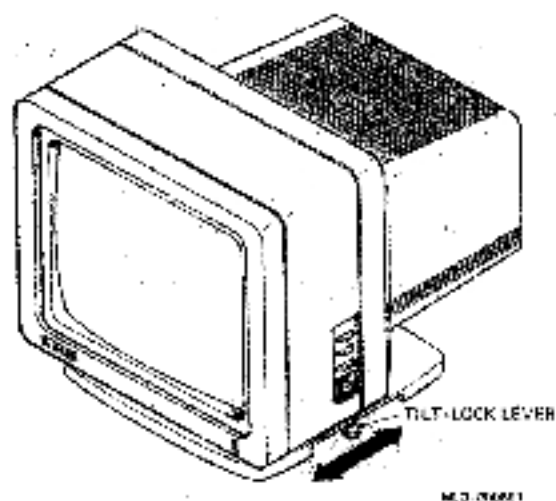
Figure 1-48: Setting the VR290 on a Level Surface



VR290-000001

1. Locate the large color monitor (VR290).
2. Place the monitor on a level surface near the VAXstation 2000 system unit.
3. To tilt the monitor:
 - a. Slide the tilt-lock lever (Figure 1-49) away from you (toward the back of the monitor) to unlock the monitor from the base.

Figure 1-49: Tilt-lock Lever, VR290 Color Monitor



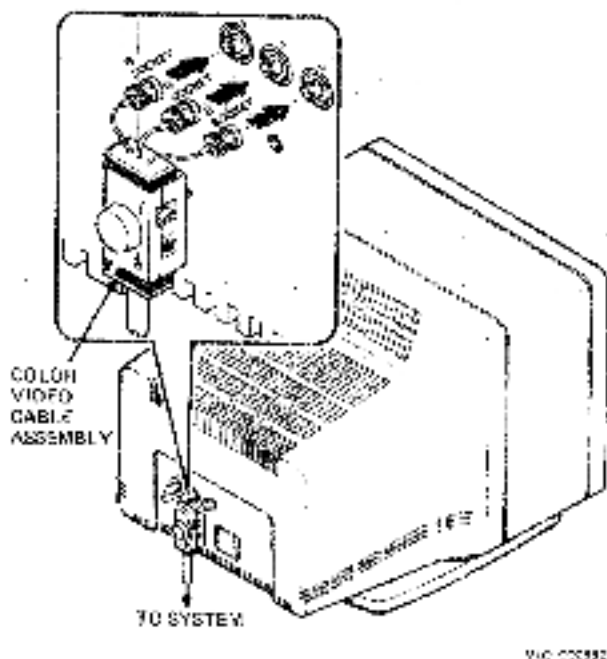
- b. Tilt the monitor to the desired position.
- c. Slide the lever toward you to lock the monitor in place.

How to Connect the Video Cable Assembly to the Large Color Monitor (VR290)

The color video cable assembly comes with two different length knobs to attach it to the monitor. The longer knob is for the large color monitor (VR290). The shorter knob is for the small monochrome monitor (VR130) with gray-scale capabilities.

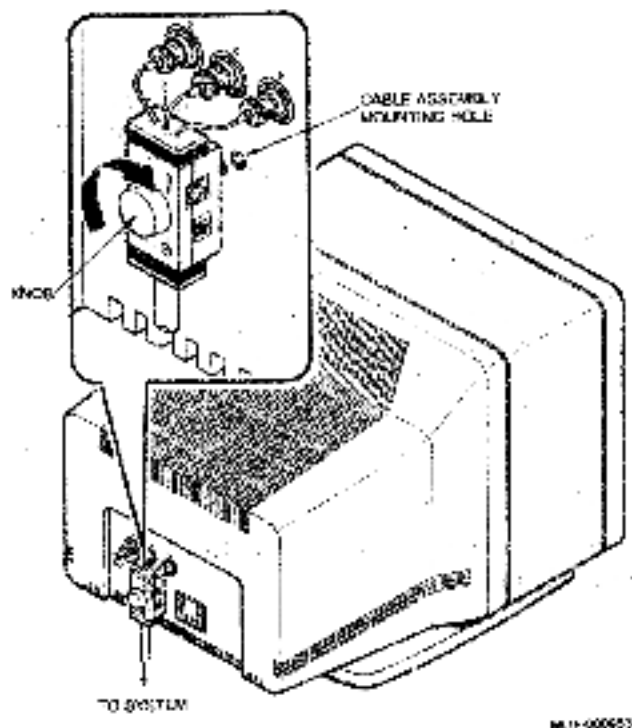
1. Insert the connectors of the R, G, and B video cables into the corresponding R, G, and B sockets on the back of the monitor (Figure 1-50). Turn each connector clockwise to fasten.

Figure 1-50: R, G, and B Sockets, VR290 Color Monitor



2. Locate the longer knob of the two knobs that come with the color video cable.
3. Insert the knob into the color video cable assembly.
4. Turn the knob (Figure 1-51) on the video cable assembly clockwise to secure it to the monitor.

Figure 1-51: Video Cable Assembly Knob, VR290 Color Monitor

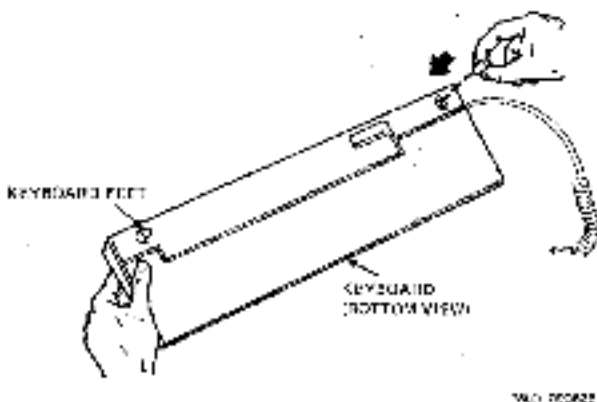


Note: The voltage level on the color monitor is set at the factory; you do not need to reset it.

Step 6. How to Connect the Keyboard to the Large Color Monitor (VR290)

1. Locate the keyboard.
2. Turn over the keyboard and push in the keyboard feet (Figure 1-52). Installation of the keyboard feet is optional.

Figure 1-52: Connecting the Keyboard Feet, VR290 Color Monitor

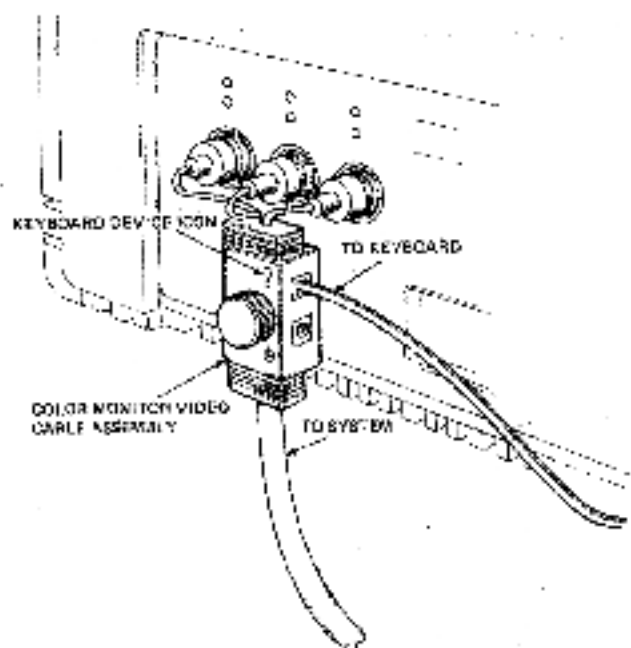


3. Turn the keyboard right side up.

Caution: Do not disconnect or connect the keyboard cable while the system power is on.

4. Connect the free end of the keyboard cable to the video cable assembly on the rear of the monitor. The socket is marked with a keyboard icon. Figure 1-53 shows the keyboard connected to the VR290 color monitor.

Figure 1-53: Keyboard Connection, VR290 Color Monitor

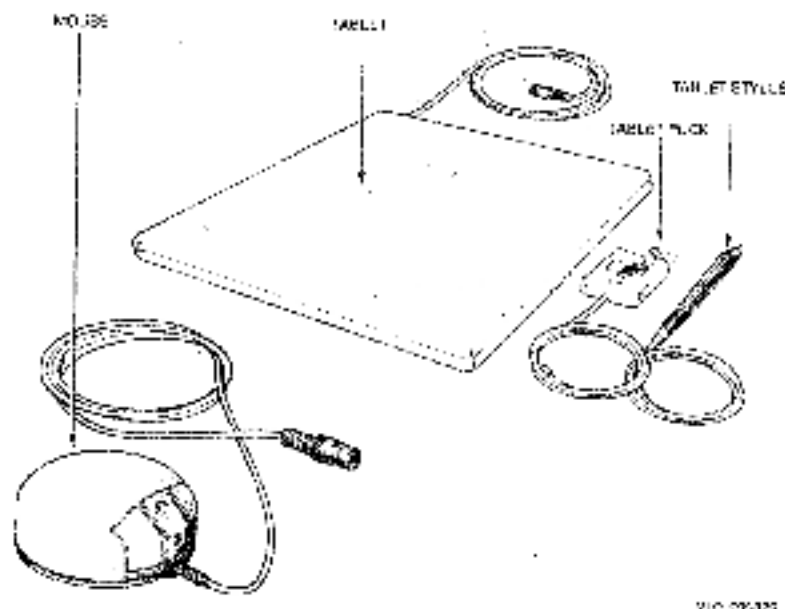


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Step 7. How to Connect the Pointing Device to the Large Color Monitor (VR290)

1. Locate the pointing device you wish to use, which may be either a mouse (standard) or a tablet (optional) (Figure 1-54). The mouse and the tablet cannot be used at the same time.

Figure 1-54: Mouse and Tablet, VR290 Color Monitor



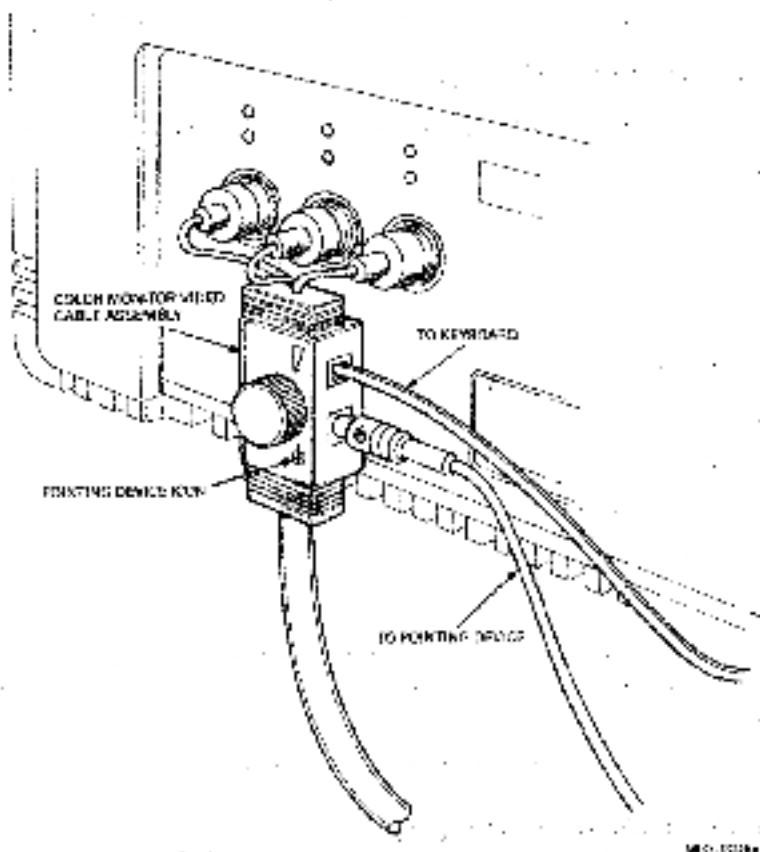
2. If you are connecting a tablet, attach the puck or stylus to the tablet before connecting the tablet to the VAXstation 2000. The instructions that come with the tablet explain how to connect those components.

Note: To switch the tablet's puck and stylus, first disconnect the tablet from the VAXstation 2000, then swap the puck or stylus, and reconnect the tablet to the system.

Caution: Do not disconnect or connect the pointing device cable while the system power is on.

3. Push the free end of the pointing device cable into the socket on the video cable assembly (Figure 1-55). The socket is marked with a pointing device icon.

Figure 1-55: Pointing Device Connection, VR290 Color Monitor



After your monitor is set up, go to Step 8 on page 1-58.

Step 8. How to Connect the Options

To connect a printer, a modem, or expansion box cables, follow the instructions in this section under the option you are connecting. The options can be connected in any order; however, it is easier to connect the expansion box(es) last.

If you order the memory module or expansion adapter after the initial shipment, contact your service representative to install those items.

How to Connect a Printer

This section describes how to connect the following DIGITAL printers:

- Laser printers
 - LN03
 - LN03 PLUS
 - LN03R
- Color printers
 - LCC01
 - LJ250/252
- Dot matrix printers
 - LA210
 - LA75

Cables are required to connect a printer to the VAXstation 2000. You must order the appropriate cable in addition to the printer. Most printers require the BCC05 cable.

Table 1-2 shows the required cable for other printers.

Table 1-2: Cables for Printers

Printers	Required Cable
LA75	DECconnect office (part no. BC16C) and 9-pin printer port adapter (part no. H8571B)
LJ250/252	BC19M

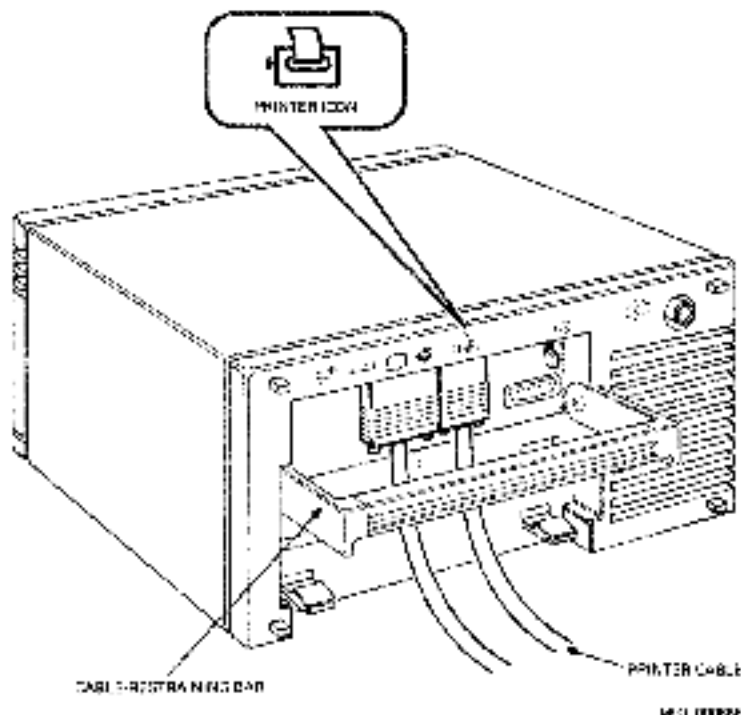
Contact your sales representative if you did not already order those items.

How to Connect a Printer, Step-by-step

1. Unpack and set up the printer according to instructions that are shipped with the printer.
2. Make sure that the on-off switches for the printer and the VAXstation 2000 system unit are set to 0 (off).

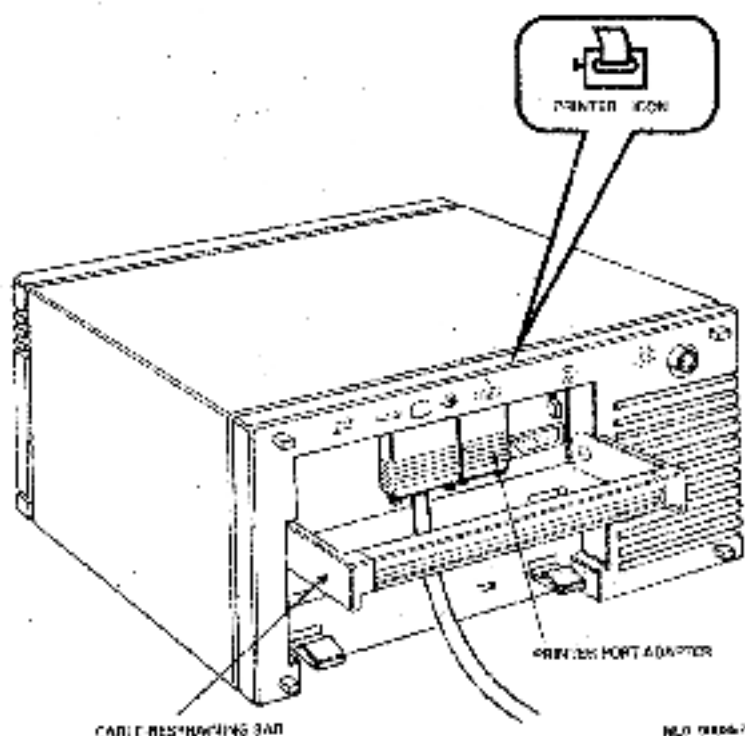
3. To connect LN03, LN03 PLUS, LN03R, LA210, ECC01, printers, do the following:
 - a. If the cable-restraining bar on the rear of the VAXstation 2000 is not already lifted, lift it up.
 - b. Locate the printer cable (part no. BCC05) or BC19M cable for the LJ250/252 (part no. BCC19-13).
 - c. Attach the larger end of the printer cable to the back of the printer. (Check the documentation that shipped with the printer.)
 - d. Attach the free end of the printer cable to the printer port on the back of the VAXstation 2000 (Figure 1-56). The printer port is marked with a printer icon.

Figure 1-56: Connected Printer Cable



4. To connect the LA75 printer, do the following:
 - a. Locate the 9-pin printer port adapter (part no. H18571B).
 - b. If the cable-restraining bar on the rear of the VAXstation 2000 system unit is not already lifted, lift it up.
 - c. Connect the printer port adapter (figure 1-57) to the printer port on the rear of the VAXstation 2000 system unit. The printer port is marked with a printer icon.

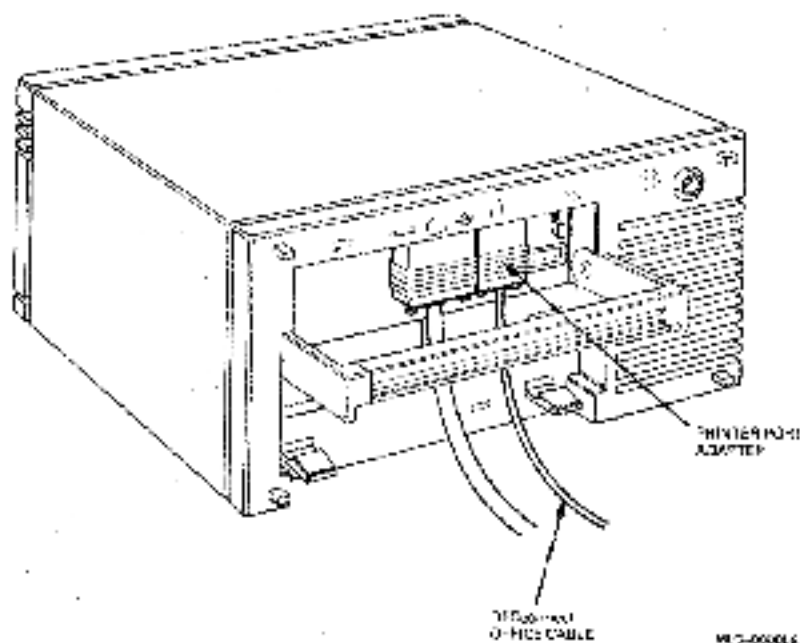
Figure 1-57: Connected Printer Port Adapter



- d. Use your fingers to tighten the 9-pin adapter's thumbscrews on the 9-pin printer port adapter by turning them clockwise.
 - e. Locate the DECconnect office cable (part no. BC16E).

- f. Connect either end of the DECconnect office cable into the printer port adapter (Figure 1-58). (The two ends of the DECconnect office cable are identical and, therefore, interchangeable.)

Figure 1-58: DECconnect Office Cable Connected to Printer Port Adapter



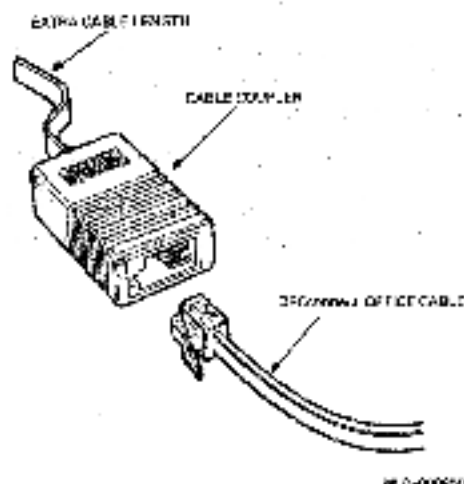
- g. Connect the free end of the DECconnect office cable into the LA75's 6-pin connector. (Check the documentation that shipped with the LA75 to locate the 6-pin connector.)

Extending LA75's DECconnect Office Cable

To extend the length of the LA75's DECconnect office cable, do the following. If you do not have the optional items mentioned, contact your sales representative.

1. Locate the additional DECconnect office cable. The DECconnect office cable comes in different lengths.
2. Locate the cable coupler (part no. H18572).
3. Insert either end of the additional DECconnect office cable length into either side of the cable coupler.
4. If you want to shorten the cable length, use a crimping tool. Follow the instructions that shipped with the crimping tool for shortening the cable.
5. Insert either end of the LA75's DECconnect office cable into the free end of the cable coupler (Figure 1-59). (You can install as many cable couplers as you have cable segments.)

Figure 1-59: DECconnect Office Cable and Cable Coupler



Operation Procedures

Set the printer's *baud rate* to 4800 to match the VAXstation 2000 system unit's printer port baud rate. (Refer to the documentation that shipped with the printer for setting the baud rates.) Then check the following list to see what procedures you need to follow for the proper operation of your printer.

- For systems running ULTRIX operating system software, you must set the printer for 7-bit ASCII. (Refer to the documentation that shipped with the printer to set 7-bit ASCII.)
- The LA210 printer requires that the XOFF and Wrap be enabled. (Refer to the LA210 documentation for switch-toggling information.)
- B1 through B4 control baud rate. For example, set B1 and B4 to on for a 4800-baud rate.
- The next two switches control paper size. For example, set to L5 and A4 for United States letter size paper.
- The Y/D switch controls cabling. The D setting is for a direct connection, and the Y setting is for the eavesdrop connection.
- The S1 and S2 switches control *byte size* and parity. Set both to off for 8-bit bytes and no parity checking.

After you have properly completed all the instructions in this guide and successfully installed the operating system, complete the following procedures for proper operation of the printer:

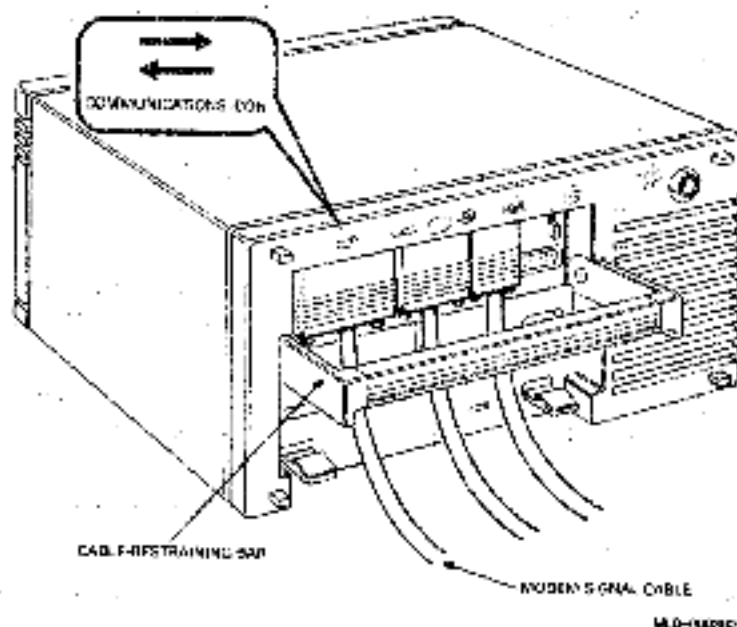
- Refer to the operating system documentation to define the printer port.
- For systems running ULTRIX operating system software, you must run LPR setup. Refer to the *ULTRIX-32w System Management Guide*.

How to Connect a Modem

A modem allows communication between the VAXstation 2000 and another system over telephone lines. This section describes how to connect a modem to your VAXstation 2000.

1. Unpack and set up the modem according to instructions that shipped with the modem.
2. Set the modem's baud rate to 1200 to match the VAXstation 2000 system unit's communication port's baud rate. (Refer to the documentation that shipped with the modem for setting baud rates.)
3. Locate the modem's 25-conductor cable (part no. BCC04). If you do not already have this cable, you must order one from your sales representative.
4. Connect an end of the 25-conductor cable to the modem's 25-pin connector. (Check the documentation that shipped with the modem to locate the modem's 25-pin connector.)
5. If the cable-restraining bar on the rear of the VAXstation 2000 system unit is not already raised, lift it up.
6. Connect the free end of the modem's 25-conductor signal cable to the video cable assembly marked with a double-arrow communications icon (Figure 1-60).
7. Use your fingers to tighten the thumbscrews on the modem's signal cable by turning them clockwise.
8. Replace the cable-restraining bar by pressing it in with your fingers until it locks into place.

Figure 1-80: Connected Modem Signal Cable



How to Connect an Expansion Box

Caution: Only devices such as the RD53-Fx and the RD54-Fx, which were designed to operate with the VAXstation 2000, may be attached to connector B. Likewise, devices such as the RD53-Fx or RD54-Fx must not be connected to other systems for which they were not designed. Circuit damage and/or data loss may occur.

Caution: Do not place the system unit or expansion boxes on their fronts, as it may damage the drive doors on the box fronts.

Use the cable-restraining bar as a handle to carry the unit.

The expansion box houses either a *tape drive* or a *fixed disk drive* and is shipped with a drive cable. The drive cable connects the expansion box to the VAXstation 2000 system unit's expansion adapter.

You may install a total of two expansion boxes (one with a *fixed disk* and one with a *tape drive*). If you are connecting more than one expansion box, first install the expansion box with the tape drive and then install the expansion box with the fixed disk.

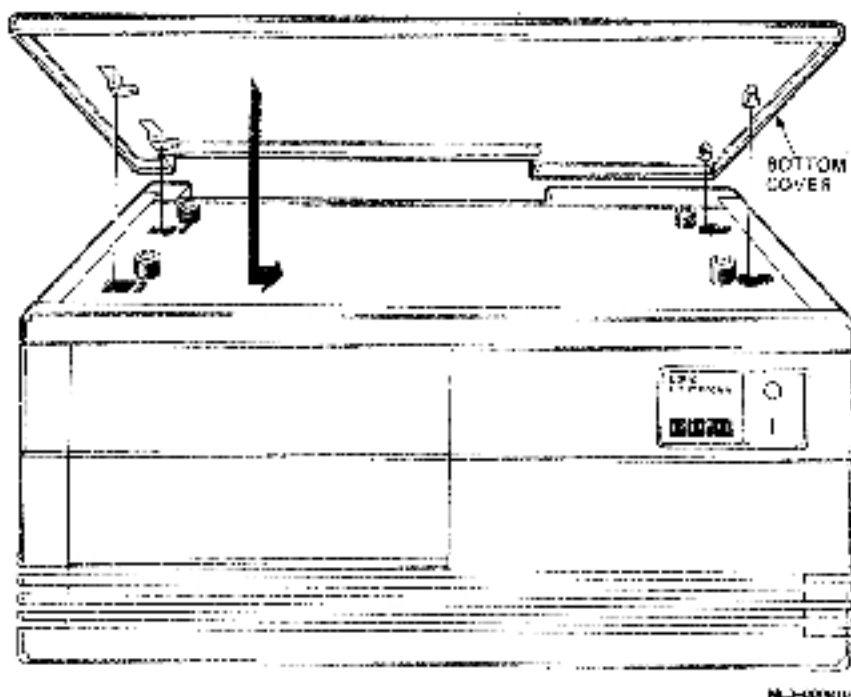
How to Position the Expansion Box

1. You may set up the expansion box on top of the system unit, underneath the VAXstation 2000 system unit, on its bottom rubber feet, or on either side.

If you want to position the expansion box on its side, you should first install the bottom cover. To install the bottom dress cover, do the following:

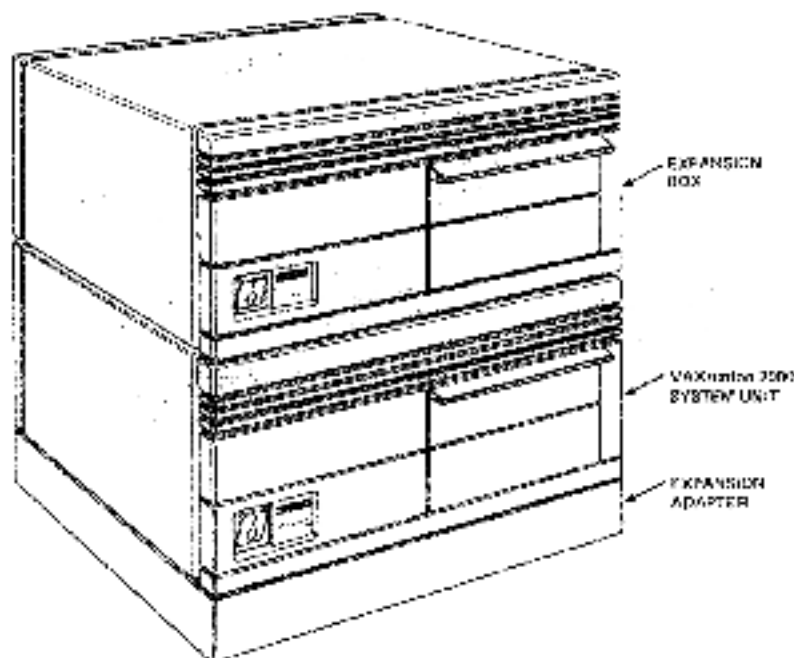
- a. Place the expansion box upside down on a level surface.
- b. Locate the bottom cover. Line up the molded inserts on the inside of the bottom cover over the holes on the bottom of the expansion box (Figure 1-61). Then slide the bottom cover until it locks into place.

Figure 1-61: Bottom Cover on Expansion Box



2. Place the expansion box on a level surface in one of the recommended positions. (The illustrations throughout this guide show one expansion box set up on top of the VAXstation 2000 system unit (Figure 1-62). If you wish to position the expansion box in one of the other positions, follow the text and use the illustrations for cabling installation reference.)

Figure 1-62: Expansion Box on Top of System Unit



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If you are connecting two expansion boxes, only one expansion box can be placed on top of the system unit; the other one must be placed on its side or underneath the VAXstation 2000 system unit.

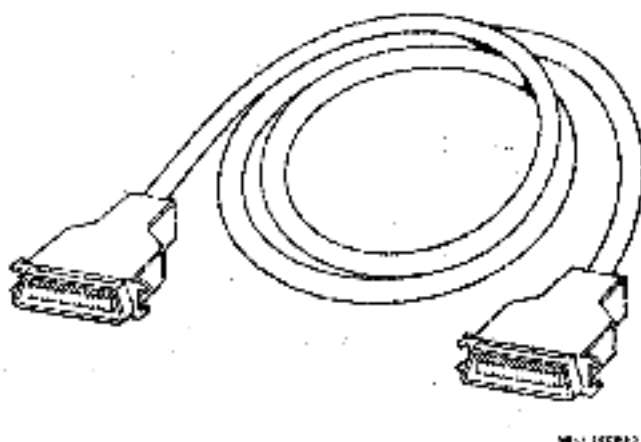
Caution: Do not place two expansion boxes on top of the VAXstation 2000 system unit. You will damage the system unit and internal boards.

3. If you are connecting an expansion box with a tape drive, follow the instructions under Connecting the Tape Drive Cable. If you are connecting an expansion box with a disk drive, follow the instructions under Connecting the Disk Drive Cable.

How to Connect the Tape Drive Cable

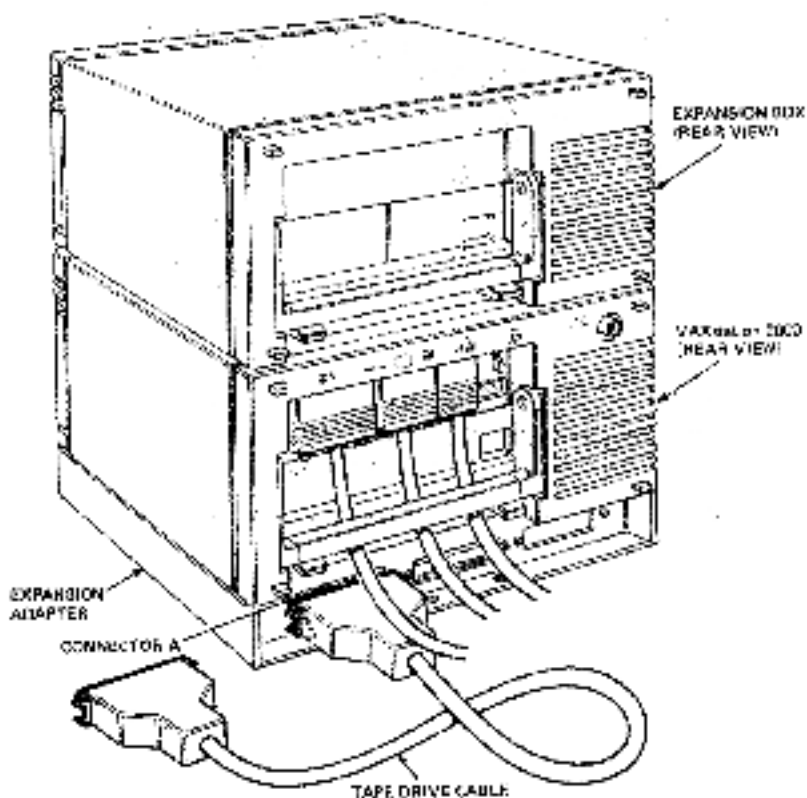
1. Locate the tape drive cable (part no. BC195). (The tape drive cable is available in different lengths; therefore, your tape drive cable may be different than in Figure 1-63.)

Figure 1-63: Tape Drive Cable



2. Insert an end of the tape drive cable into connector A on the expansion adapter (Figure 1-64). (Each end of the cable is identical and, therefore, interchangeable.)

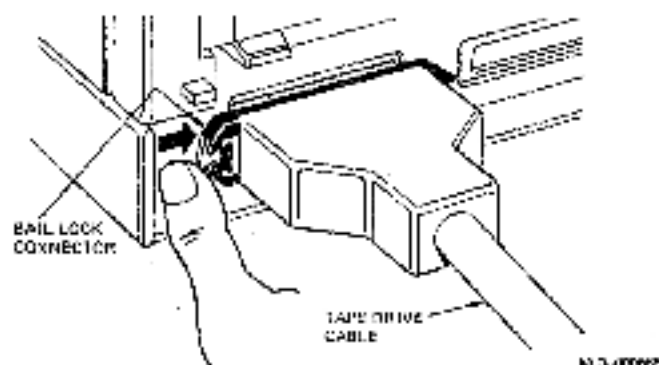
Figure 1-64: Tape Drive Cable Connected to Expansion Adapter



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3. Fasten the bail lock connectors on the tape drive cable connector by prussing them in with your finger (Figure 1-65).

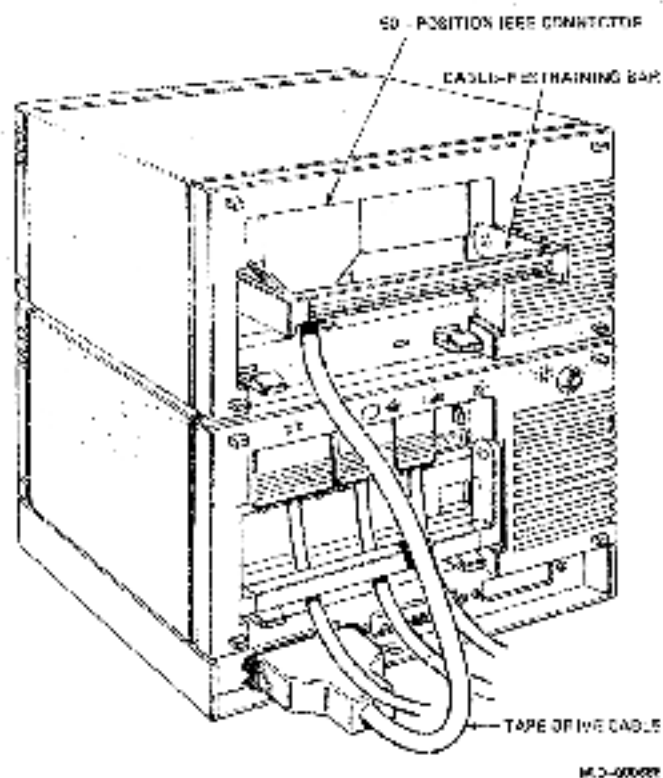
Figure 1-65: Fastening the Bail Lock Connectors



4. Make sure the cable-restraining bar on the rear of the VAXstation 2000 system unit is replaced. If the cable-restraining bar is not replaced, press it in with your fingers until it locks into place.
5. Lift the cable-restraining bar on the expansion box.

6. Insert the free end of the tape drive cable under the cable-restraining bar on the expansion box and into the 50-position IEEE connector on the expansion box (Figure 1-66).

Figure 1-66: Tape Drive Cable Connected to Expansion Box

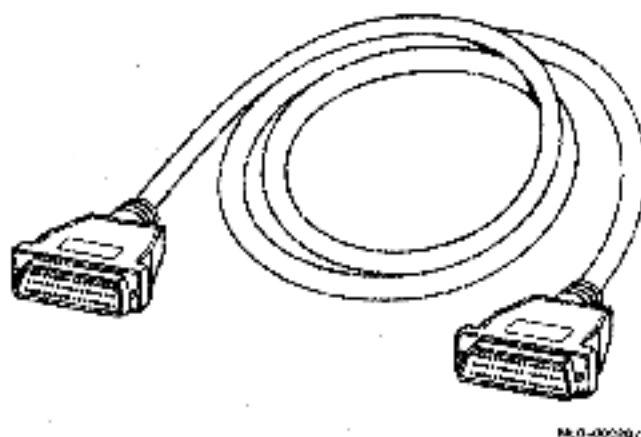


7. Fasten the bail lock connectors on the tape drive connector by pressing them in with your finger.

How to Connect the Disk Drive Cable

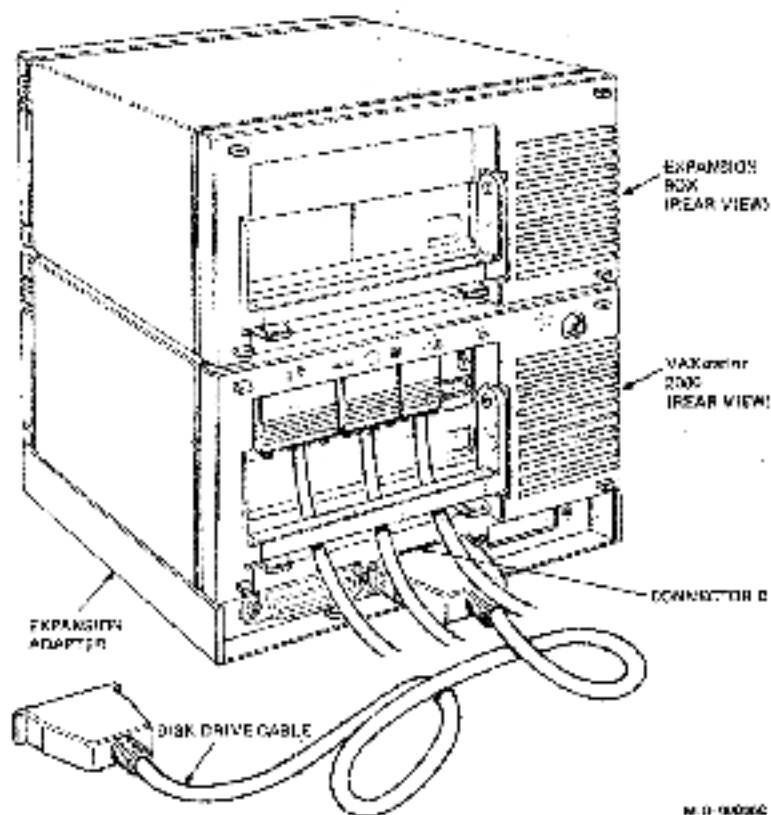
1. Locate the disk drive cable (part no. BC17Y). (The disk drive cable is available in different lengths; therefore, your disk drive cable may be different than in Figure 1-67).

Figure 1-67: Disk Drive Cable



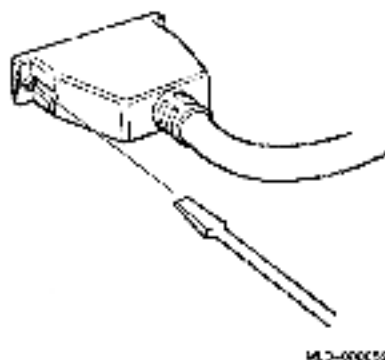
2. Insert an end of the disk drive cable into connector B on the expansion adapter (Figure 1-68). (Each end of the cable is identical and, therefore, interchangeable.)

Figure 1-68: Disk Drive Cable Connected to Expansion Adapter



3. Use the flat-blade screwdriver you received with your shipment to turn the two disk drive cable connector screws clockwise (Figure 1-69).

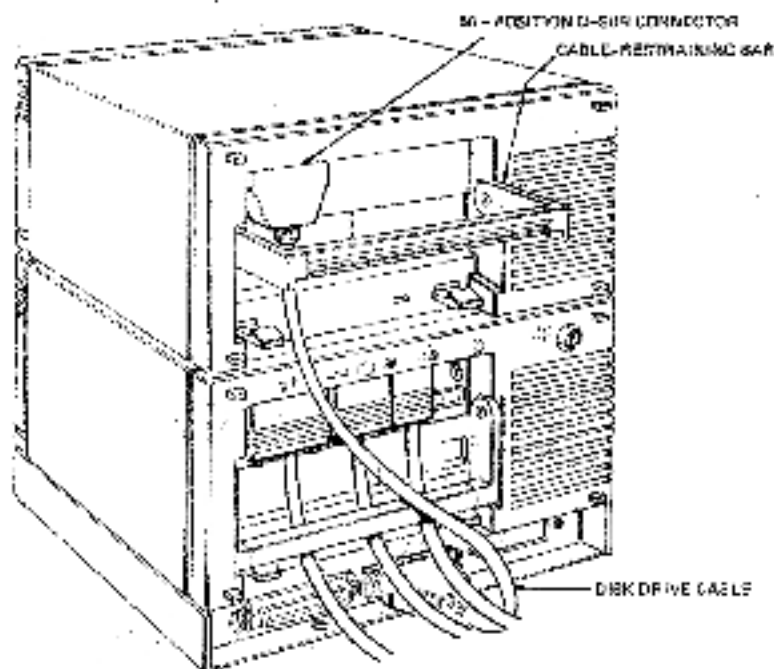
Figure 1-69: Fastening the Disk Drive Cable



4. Make sure the cable-restraining bar on the rear of the VAXstation 2000 system unit is replaced. If the cable-restraining bar is not replaced, press it in with your fingers until it locks into place.
5. Lift the cable-restraining bar on the expansion box.

6. Insert the free end of the disk drive cable under the cable-restraining bar on the expansion box and into the 50-position D-sub connector on the expansion box as shown in Figure 1-70.

Figure 1-70: Disk Drive Cable Connected to the Expansion Box



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7. Use the flat-blade screwdriver to turn the two disk drive cable connector screws clockwise to fasten the cable connector.

Step 9. How to Connect the Power Cords

1. Make sure the cable-restraining bar on the rear of the VAXstation 2000 and on any expansion box is replaced. If any cable-restraining bar is not replaced, press it in with your fingers until it locks into place.
2. Locate the monitor power cord and system unit power cord (Figure 1-71). The two cords are the same type and interchangeable. Make sure that the plugs fit the wall outlet. If they do not, contact your sales representative.
3. Make sure that the monitor on-off switch is set to 0 (off) for the monitor that you have (Figures 1-72, 1-73, 1-74, and 1-75).

Figure 1-71: Power Cords

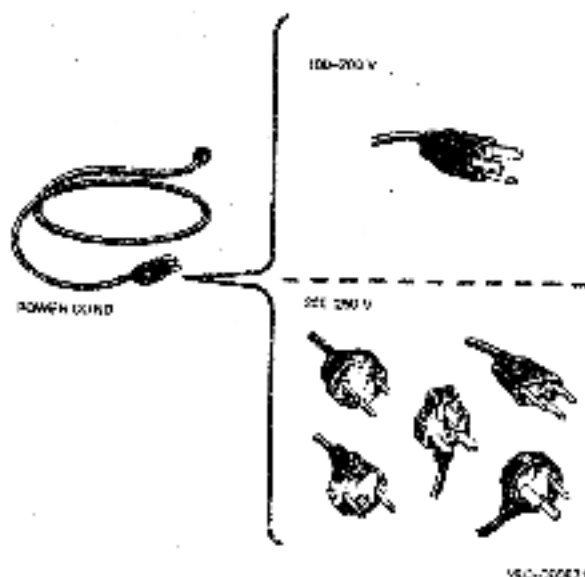


Figure 1-72: On-Off Switch, VR290 Color Monitor

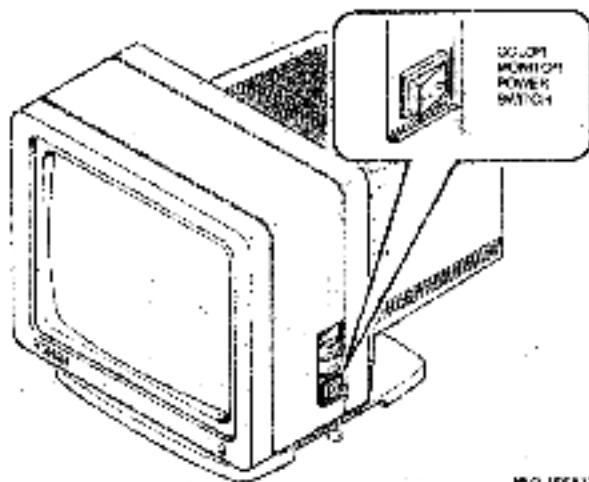


Figure 1-73: On-Off Switch, VR260 Monochrome Monitor

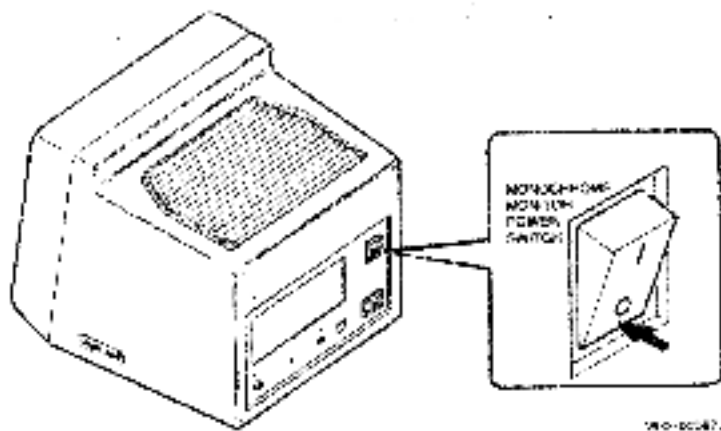
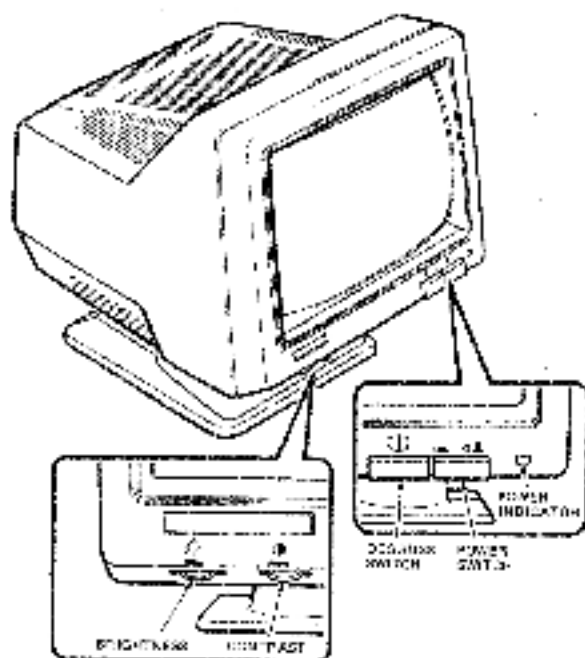
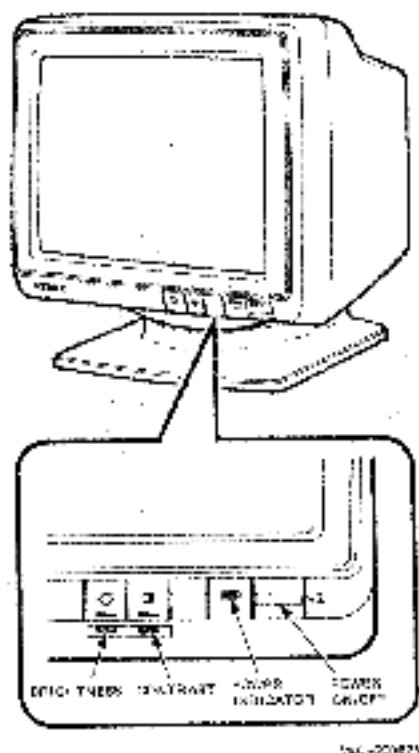


Figure 1-74: On-Off Switch, VR160 Color Monitor



VAC-50027

Figure 1-75: On-Off Switch, VR150 Monochrome Monitor



4. Connect the monitor's power cord to the monitor first and then to an outlet (Figures 1-76, 1-77, 1-78, and 1-79).

Warning: Place the power and system cables in areas where no one will trip over them or step on them. Avoid straining or sharply bending the cables.

Caution: To avoid damaging a monitor that has been moved inside from a cold environment, let the monitor warm to room temperature before you turn it on.

Figure 1--76: Power Card Connection, VR290 Color Monitor

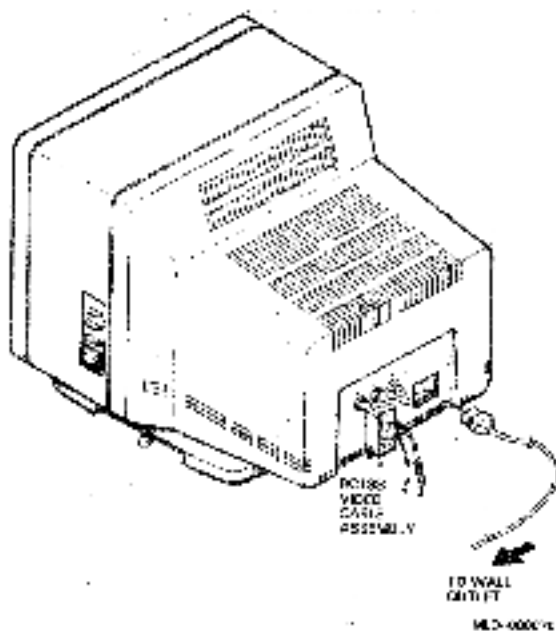


Figure 1-77: Power Cord Connection, VR260 Monochrome Monitor

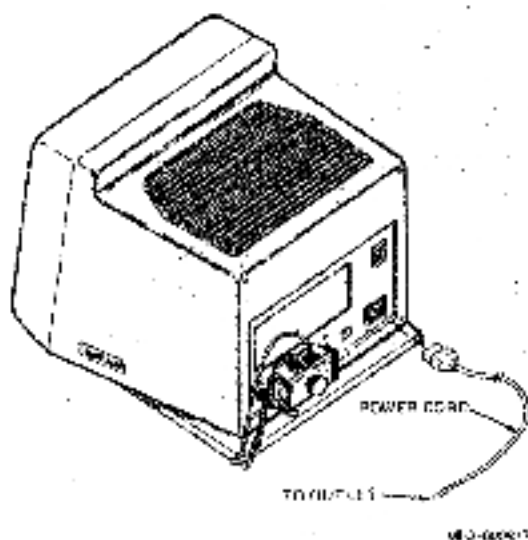


Figure 1-78: Power Cord Connection, VR160 Color Monitor

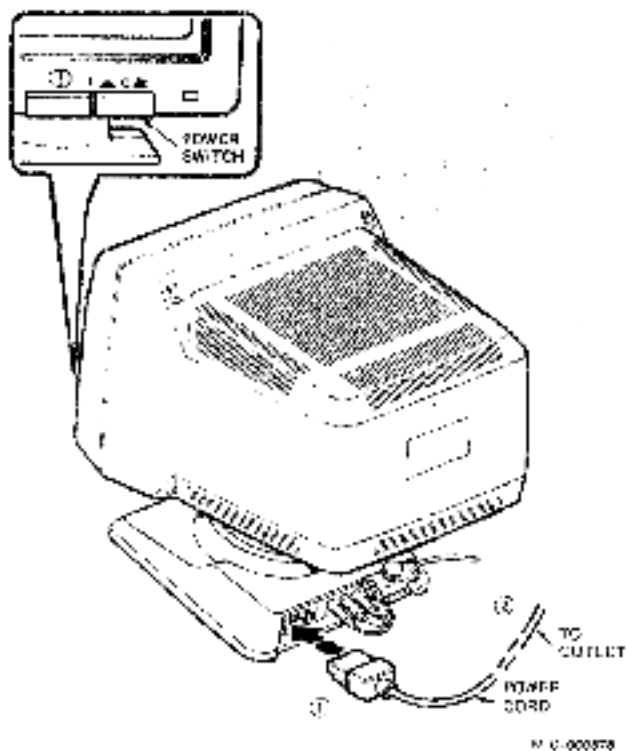
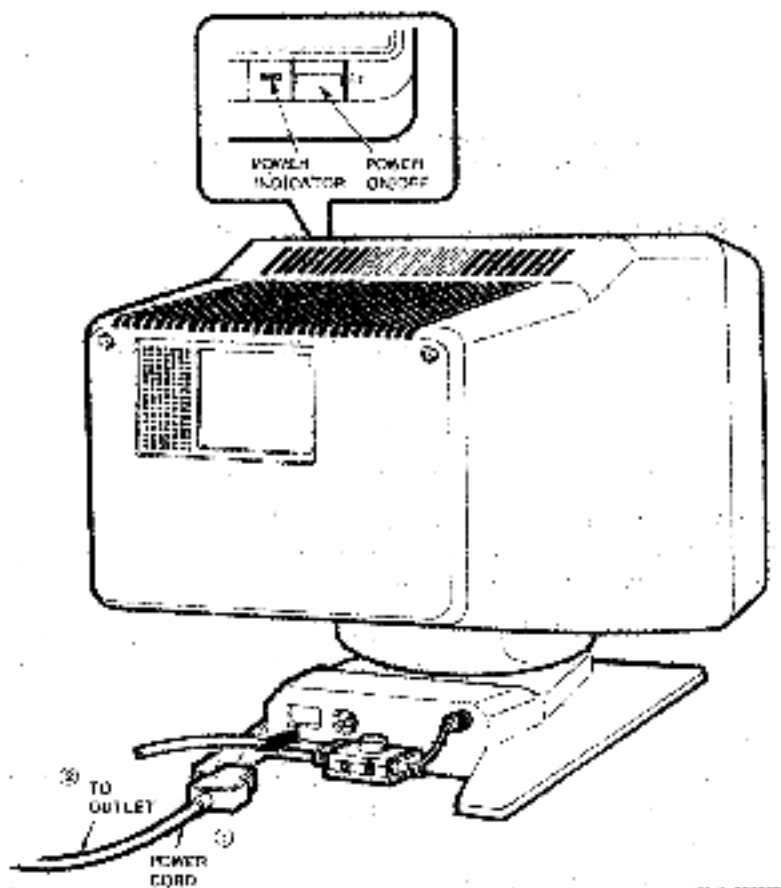


Figure 1-79: Power Cord Connection, VR150 Monochrome Monitor



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Step 10. How to Start the Monitor

1. Set the monitor power switch to the on position.
2. Watch for the green power indicator to turn on. Wait about 30 seconds for a video display.

Note: If the green power indicator does not turn on, or if a video display does not appear, refer to the Troubleshooting chapter in this manual.

Set the brightness and contrast controls

1. Increase both the brightness and contrast to maximum.
2. Decrease the brightness until the raster (background intensity) just disappears.
3. Adjust the contrast to your viewing preference.
4. Adjust the monitor to a comfortable viewing angle.

Caution: If you have a tilt-swivel base, the monitor does not swivel in a complete circle. If you try to swivel the monitor in a complete circle, you may damage the base.

5. To set the angle, tilt the monitor forward or backward to the desired position. You can swivel the monitor about its base and still maintain the tilt angle.
6. The color monitor may show signs of poor color purity after swivel action. Poor color purity exists if you see other colors scattered in different places in the screen display. Press the degauss switch for five seconds to correct color distortions.

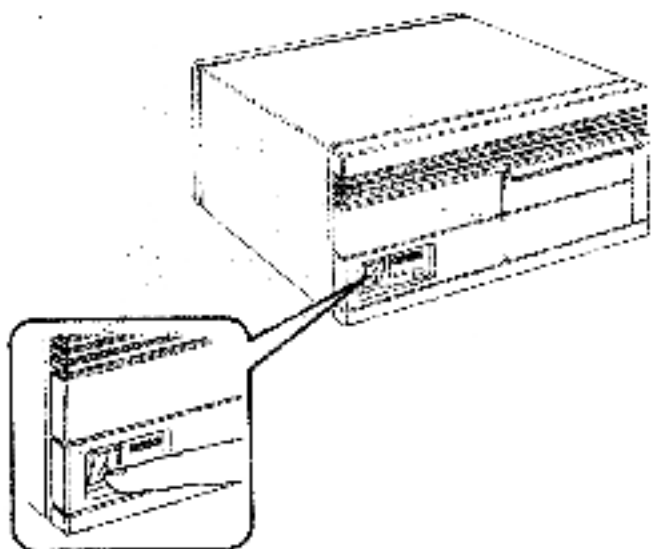
Note: If you need to press the degauss switch again, wait 10 minutes to allow the circuit to fully reactivate.

7. Be sure to turn off the monitor before you start the system.

How to Start the System

1. Make sure that the on-off switch on the VAXstation 2000 system unit is set to 0 (off) (Figure 1-80).

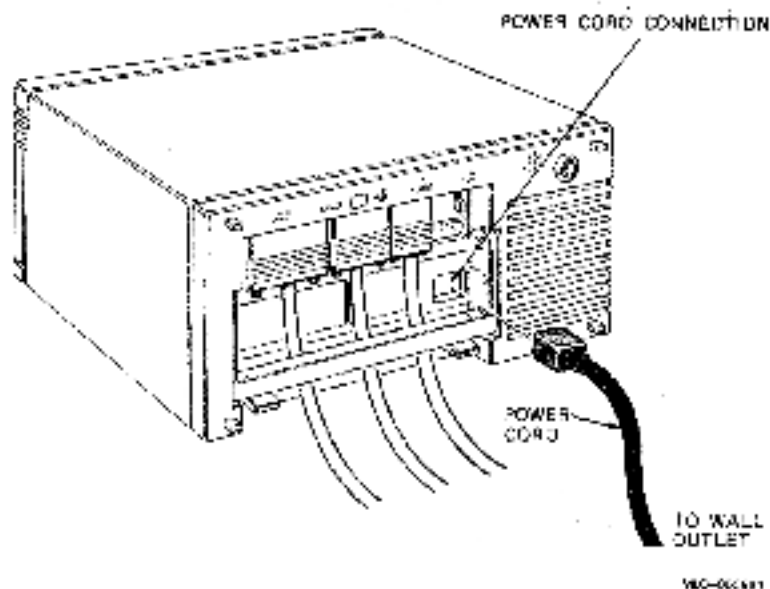
Figure 1-80: On-Off Switch, System Unit



1410 100000

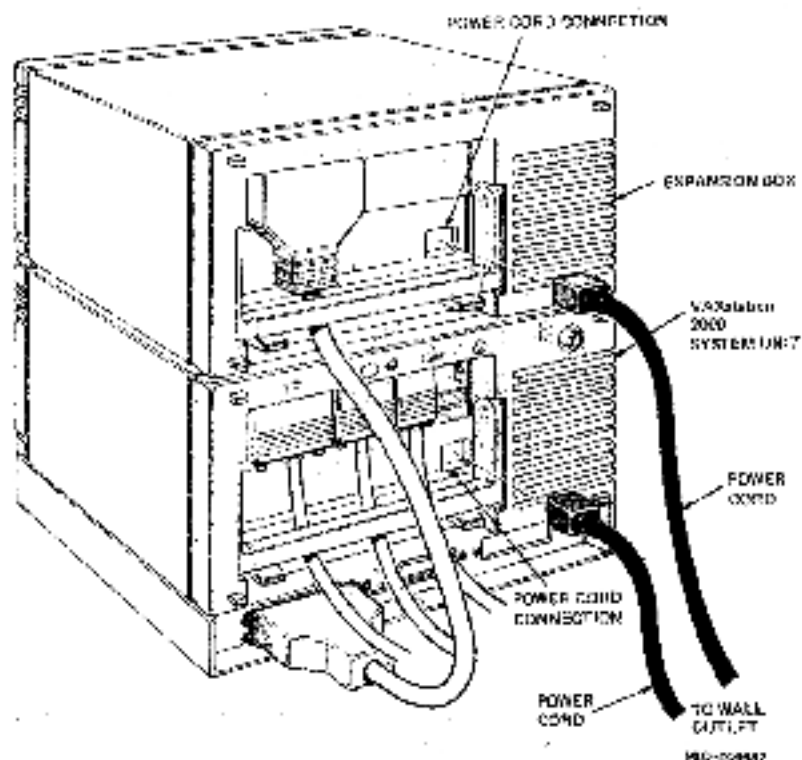
2. Connect the VAXstation 2000 system unit's power cord to the system unit first and then to an outlet (Figure 1-81).

Figure 1-81: Power Cord Connection, System Unit



3. If you have the optional expansion box(es) connected, make sure the expansion box on-off switch is also set to 0 (off). (The on-off switch on the expansion box is located in the same place as the system unit's on-off switch.) Next connect the expansion box power cord to the expansion box and then to an outlet (Figure 1-82).

Figure 1-82: Power Cord Connection, Expansion Box

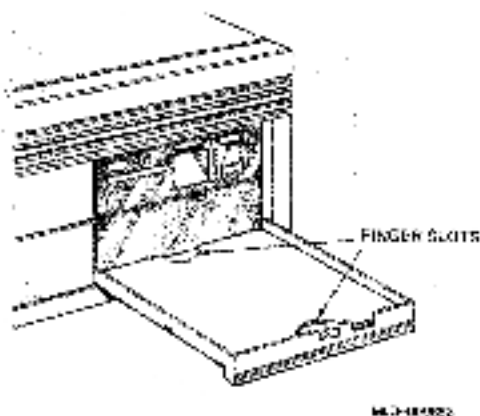


Step 11. How to Test the VAXstation 2000

The VAXstation 2000 *diagnostics* tests are stored in VAXstation 2000 *read-only memory*. After every *power up*, the VAXstation 2000 automatically starts the system tests, which check the components of your system. The first time you start your system, follow the steps in this section to ensure proper functioning of your VAXstation 2000.

1. Before you turn on your system, open the drive door on the front of the VAXstation 2000.
2. Remove the cardboard shipping insert from the inside of the drive door by placing fingers in the insert's finger slots and lifting out (Figure 1-83).

Figure 1-83: Removing Cardboard Shipping Insert in Door



3. If your VAXstation 2000 contains an RX33 *diskette drive*, remove its cardboard shipping insert. To remove the insert:
 - a. Flip up the lever on the diskette drive (Figure 1-84).
 - b. Remove the cardboard insert (Figure 1-85).
4. Close the drive door.

Figure 1-84: Diskette Drive Lever

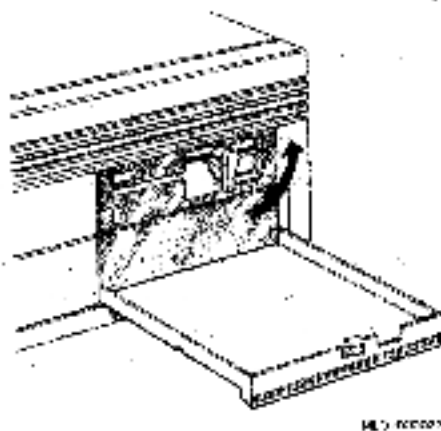
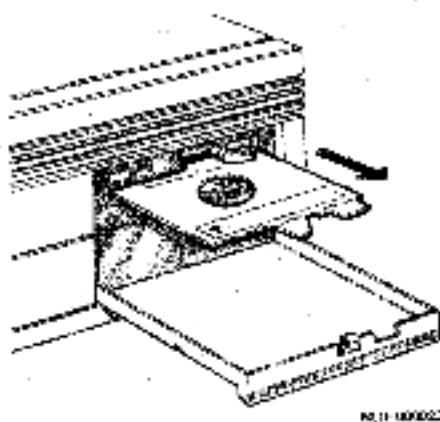


Figure 1-85: Removing Cardboard Shipping Insert in Diskette Drive



Caution: Power up any expansion boxes before powering on the system unit so that any tapes or disks can be included in the configuration.

5. Start the equipment.
 - a. Start the monitor by setting the monitor power switch to 1 (on).
 - b. Start any optional equipment (for example, printers and expansion boxes) by setting the on-off switch to 1 (on).
 - c. Start the VAXstation 2000 by setting the system unit power switch to 1 (on).

Caution: Do not power down the VAXstation 2000 until power-up testing is complete. Wait until you see either the *console prompt* (`>>>`) or the first screen of your operating system software or wait until the system unit attempts to *bootstrap*. If the following display appears, press the halt button to see the results of the self test.

```
B3 BOOT SYS
-DUAD
-ESAD
754 RETRY
```

Powering down before testing is complete may destroy data in the system's nonvolatile random-access memory.

6. The monitor screen then displays a power-up display. The following three displays are examples of successful power-up displays. Find the display that matches your power-up display. Some of these displays require user interaction.

Possible system problems are indicated by one or two question marks (?) or ??) on the monitor screen. If a single or double question mark appears and no explanation of this possible problem is given in the example, or if you do not see one of the displays listed below, power down the VAXstation 2000 and review each installation step. Repeat the power-up procedure. If you still have trouble, refer to the Troubleshooting chapter in this manual.

- a. You may see a display similar to the following:

KA410-E V2.1

F...E...D...C...B...A...9...8...7...6...5...4...3...2...1?

```
? E 0040 0000.0005
? D 0050 0000.0005
? 6 00A0 0000.4001
?? 1 00C0 0000.7004
>>>
```

If the line with the ? E appears, the system time clock has not been set. When you install the operating system software, you will set the date and time.

If the line with the ? D appears, the battery charge is low. Once the system is powered up, it will take about 17 hours for the battery to recharge.

If the line with the ? 6 appears, the diagnostics do not find a tape drive installed. If you do not have a tape drive installed, ignore this message. However, if you do have a tape drive installed, power down the VAXstation 2000 system unit and review the tape drive installation steps (refer to Connecting the Expansion Box). If you still have trouble, refer to the Troubleshooting chapter of this manual.

If the line with the ?? 1 appears, the Ethernet module is contained within the system unit, but the outer Ethernet cable has not been connected yet. Refer to the *Workstations and MicroVAX 2000 Network Guide*, to install the ThinWire Ethernet cable.

If the monitor screen displayed other possible system errors, refer to the Troubleshooting chapter of this manual. If the screen displayed only the possible system errors listed above, proceed to How to Enter the Test Commands.

- b. Or, you may see a display similar to the following:

KA410-B V2.1

F...E...D C...B...A 9...8 7...6...5 4...3...2...17..

83 BOUT SYS

- DUA0

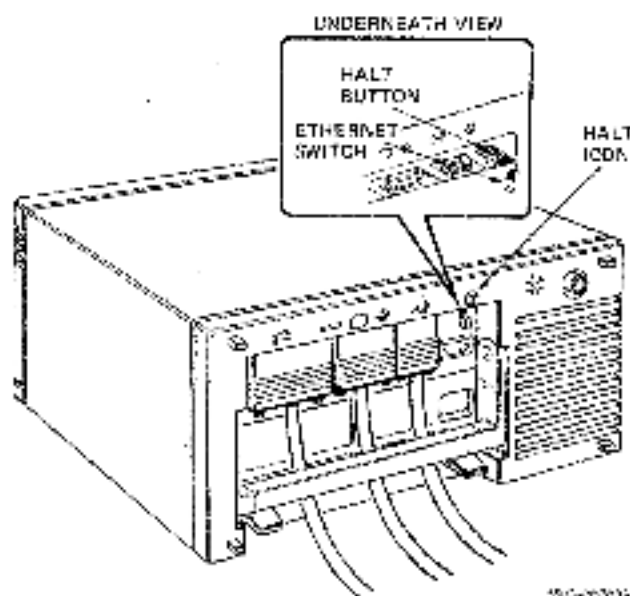
- ESA0

764 RETAY

The screen may also display the following devices: DUA1, DUA2, or MUA0. Press the halt button to get the console prompt (>>>).

The halt button is marked with an encircled triangle or halt icon (Figure 1-86).

Figure 1-86: Halt Button



After you press the halt button, you will see a display similar to the following:

```
702 EXT HLT
    PC = 00C01B4E
>>>
```

The system was trying to search the *network* for the operating system software and did not find it. However, the networking hardware and operating system software have not been installed yet. You will be instructed later in this guide in *Connect ThinWire Ethernet* about where to refer for connecting networking hardware. You will install the operating system software after completing the steps in this guide. Proceed to *How to Enter the Test Commands*.

- c. Or, you may see a display similar to the following:

```
KA410-B V2.1
P...E...C...B...A...9...8...7...6...5...4...3...2...1?

83 BOOT SYS
- DUA0

%VMB-F-E2R, PC = nnnnnnnn
%VMB-I-STS, RD = nnnnnnnn

84 FAIL.
>>>
```

That example may also display one of the following devices: DUA1, DUA2, MUA0, or E5A0. Ignore that message. That message indicates that the system did not find the operating system on the device mentioned (DUA0 in this example). However, the operating system software has not been installed yet. You will be instructed to install the operating system software after completing the steps in this guide. Proceed to *How to Enter the Test Commands*.

How to Enter the Test Commands

1. The first time you start the VAXstation 2000 system unit, you must initialize the keyboard. Select the language to match your keyboard language by pressing the corresponding number key from the keyboard language menu and then press RETURN (Figure 1-87). If you do not select a number and just press RETURN, the default is English (Option 3).

Figure 1-87: Keyboard Language Menu

0) Dansk	8) Français (Suisse romande)
1) Deutsch	9) Italiano
2) Deutsch (Schweiz)	10) Nederlands
3) English	11) Norsk
4) English (British/Irish)	12) Português
5) Español	13) Suomi
6) Français	14) Svenska
7) Français (Québécois)	15) Vlaams

MLC-000024

Note: A different keyboard is supplied for each language. If you do not know the language variation of the keyboard you received, check the packing list or check with your sales representative.

The language you choose is saved in nonvolatile memory; therefore, subsequent powerups do not display the keyboard language menu. If you wish to change the keyboard language, refer to the Troubleshooting chapter of this manual.

2. Type **TEST 50** and press **RETURN**. The screen displays a list of devices contained in your system. An example display is shown below; your display may be different.

```
>>> TEST 50
```

```
XA410-B V2.1
```

```
ID 08-03-25-02-CF-A4
```

```
MON3      0000.0001
```

```
7CLK      0000.0005
```

```
NVR       0000.0001
```

```
DZ        0000.0001
```

```
00000001 00000001 00000001 00000001 00000001 000012A0
```

```
NEM       0002.0001
```

```
00200000
```

```
NM        0000.0001
```

```
FP        0000.0001
```

```
IT        0000.0001
```

```
HDC       1710.0001
```

```
00014658 00000000 00000320
```

```
7TPC      0000.4001
```

```
FFFFFFFF03 FFFFFFF05 FFFFFFF06 FFFFFFF0B FFFFFFF05 FFFFFFF0B FFFFFFF05 FFFFFFF0B
```

```
SYS       0000.0001
```

```
4PIN      0000.0001 V1.0
```

```
7NI       0000.7004 V1.1
```

```
>>>
```

Information about the system is represented by the mnemonics listed in Table 1-3.

Table 1-3: Definition of Mnemonics

Mnemonics	Device
CLK	System Clock
4PIN	4-plane graphics coprocessor
8PIN	8-plane graphics coprocessor
DZ	Serial Line Controller
FP	Floating Point
HDC	Disk Controller

Table 1-3 (Cont.): Definition of Mnemonics

Mnemonics	Device
IT	Interval Timer
MEM	Memory
MM	Memory Management
MONO	Monochrome Video Circuits on System Module
NI	Network Interconnected Option Module
NVR	Nonvolatile RAM
SYS	Interrupt Controller and Ethernet ID ROM
TPC	Tape Controller

The "HDC" mnemonic represents the disk controller. The first group of numbers after the "HDC" line in the screen display tell you what type of device is installed. Look at Table 1-4 to determine which devices are listed in the display on your screen. Compare the devices listed on your screen to the devices that were installed with your system.

Table 1-4: Device Numbers

Number	Device	Height	Storage Capacity in Kilobytes
14688	RD32	half	41,820
22000	RD53	full	69,632
4C437	RD34	full	155,677
960	RX38 media in the disk drive	half	1200
320	RX50 media in the disk drive	half	400

If differences exist, review the installation procedures in this manual to make sure that every device has been properly connected. Repeat TEST 30. If differences still exist, check with your service representative.

After your VAXstation 2000 successfully completes the power-up tests, you can use the fixed disk drive to check the fixed disk and set the default boot device before connecting the operating system software.

How to Check the Fixed Disks

The Fixed Disk Verifier reports any faults in the fixed disks. It can also be used to determine whether a fixed disk has been formatted and to determine what kind of drives are contained in the system.

If you see single question marks for the disk drive controller (mnemonic FDC) during power up or while running the system exerciser, run the fixed disk verifier. This test locates and reports any faults in the fixed disks in the system. Give this information to your service representative.

You can also use the verifier to determine what kind of drives are contained in your system.

The verifier takes 5 minutes for an RD32 fixed disk drive, 8 minutes for an RD53, and 20 minutes for an RD54.

Note: The fixed disk verifier does not destroy software or data on the disk.

Note: Read your software documentation for shutdown procedures before halting the system.

1. Put the VAXstation 2000 in console mode by pressing the halt button on the rear of the system unit.
2. Type **TEST 71** at the console prompt (**>>>**), then press RETURN.

The following text is displayed:

```
VSmsv_QUE_unitno (0-1)?
```

3. Type 0 to verify a fixed disk drive in the system unit or 1 to verify a fixed disk in the expansion box, then press RETURN.

The following text is displayed:

```
VSmsv_STS_Siz ..... RDxx  [xx represents 32 or 53, depending  
                             on the type of fixed disk drive.]
```

```
VSmsv_QUE_RUsure (00Ax 1/0) ? [x represents the number  
                                chosen, 0 or 1.]
```

If the disk has not been formatted or a problem occurs with the disk, the following text appears:

```
VSnav_STS_Siz      .... ??  
VSnav_RES_Err #2  
Sa FAIL.  
>>>
```

If you see this text and you want to format your disk, format it according to the instructions in Chapter 1. If the disk is faulty, the formatter program will not be able to complete the formatting procedure. If this happens, call your service representative.

4. Type **1** and press RETURN if you want to continue. To stop the verifier, type anything other than **1**. The verifier stops, an error message is displayed, and the console prompt (**>>>**) is returned. You may start over with the **TEST 71** command or any other command.

The following sample text is displayed after you type **1**:

```
VSnav_STS_RDing    ...OK  
VSnav_STS_HBBcnt = 14  
VSnav_STS_KBBcnt = 0  
VSnav_RES_Succ  
>>>
```

This text verifies that the disk is in good operating condition. However, if you see the following text, the fixed disk is faulty and may need repair or replacement.

```
VSnav_STS_KBBcnt = X [X indicates any number higher than 50]
```

Call your service representative.

5. Type **BOOT** (or **BOOT** followed by the name of the device that contains operating system software) at the console prompt and press RETURN to return to normal operation.

Step 12. How to Format the Fixed Disk

If you found a bad block on your disk after running the format verifier, you will need to format the fixed disk.

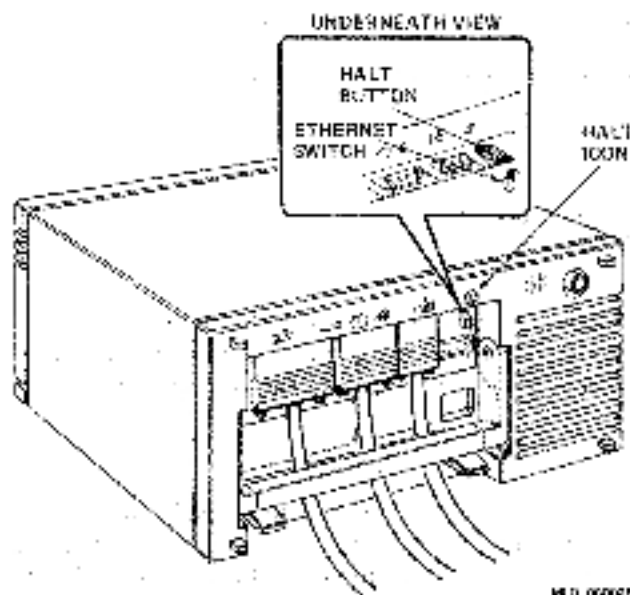
Caution: Formatting a disk destroys any stored software and data. If any software or data is already stored on the disk, back up your disk before formatting. If your disk is new, it should not already have any information stored on it. (Refer to the operating system software documentation for disk backup procedures.)

To format a fixed disk, complete the following steps. If you are going to format more than one fixed disk, complete all the steps to format one fixed disk and then run through all the steps again to format the second fixed disk.

1. Check to be sure the system is in *console mode*. Console mode is indicated by the console prompt (`>>>`) on the monitor screen. After you have tested the VAXstation 2000, it should be in console mode.

If the console prompt does not appear on the screen, press the halt button on the rear of the VAXstation 2000 system unit. The halt button is marked with an encircled triangle or halt icon (Figure 1-88).

Figure 1-88: Halt Button



2. At the console prompt, type **TEST 70** and press **RETURN**.

The following text appears on the monitor screen:

```
KA410-A RDRXInt
VSfmt_QUE_unitno (0-2) ?
```

3. Type the number **0** to format a fixed disk drive in the system unit. Type the number **1** to format a fixed disk drive in the expansion box.

If everything is working normally, the following text is displayed:

```
VSfmt_STS_Siz
```

If you have typed an incorrect number, the following text is displayed:

```
VSfmt_RES_ERR #1
```

If an *error message* occurs, start over at the first step of the formatting procedure. If you continue to see the error message, refer to the Troubleshooting chapter of this manual for information on isolating and solving problems.

If the formatter is working successfully, you will see the following text displayed as the formatter program determines the type of fixed disk drive you have selected for formatting. In the following example, the RD32 is the disk being formatted.

```
VSfmt_STS_Siz ..... RD32
```

If you see the following error messages:

```
VSfmt_STS_Siz .....??
```

or

```
VSfmt_RES_Err # 2
34 FAIL
>>>
```

a problem has occurred with the fixed disk drive. Refer to the Troubleshooting chapter of this manual for information on isolating and solving problems. If the drive is formatting properly, the following is displayed:

```
VSfmt_QUE_SerKbr (0-999999999) ?
```

4. Type in the serial number of the fixed disk and press **RETURN**. The serial number is located on the packing slip. If any letters appear in the serial number, do not type them in. Type in only the numbers. If you

do not have the serial number, you can assign a unique number for each fixed disk. Be sure to keep this unique number for future use. If you are formatting more than one fixed disk, each number must be unique.

The following text is displayed:

```
VSfmt_QUE_RUaure (DUAX 1/3) ?
```

5. Type the number 1 and press RETURN to tell the formatting program to continue. If for any reason you do not want to continue, type any number other than 1. If you do this, the formatter will stop and you will see the following message:

```
VSfmt_RES_Abtd  
84 FAIL  
>>>
```

If you choose to stop the formatter, you must restart at the first step of the formatting procedure when you are again ready to format a drive.

If you choose to continue, the following message is displayed gradually. It takes approximately 15 minutes to format an RD32 disk, 25 minutes to format an RD53 drive, and 40 minutes to format an RD54 drive.

```
VSfmt_STS_AdmBb .....OK  
VSfmt_STS_FMTing.....OK  
VSfmt_STS_ChkPass.....OK  
VSfmt_STS_SBRvec := n  
VSfmt_RES_Succ  
>>>
```

If you see this message in its entirety, the disk has been successfully formatted and is ready for use.

If a problem occurs, one of the following two messages is displayed:

```
VSfat_STS_FatIng.....??  
VSfat_RES_ERR #3  
84 FAIL  
>>>
```

or

```
VSfat_STS_CkPac.....??  
VSfat_RES_ERR #4  
84 FAIL  
>>>
```

If you see either of these messages, refer to the Troubleshooting chapter of this manual for information on isolating and solving problems.

Before you install the operating system software, you should set the default boot device. Proceed to the next section, How to Set the Default Boot Device.

Step 13. How to Set the Default Boot Device

The default boot device should be set when you determine where the operating system software is to reside. The VAXstation 2000 then boots from that device at startup. The operating system software should reside in one of the following places:

- On a fixed disk in the system unit
- On a fixed disk in the expansion box
- On a remote system that you access through the ThinWire Ethernet

The default boot device should be set to one of these. Table 1-5 shows the names assigned to each of the possible devices. (Other possible devices exist, but the devices listed are for storing VMS workstation software and operating system software.)

Table 1-5: Boot Device Names

Device and Location	Device Name
Fixed disk in system unit	DUA0
Fixed disk in expansion box	DUA1
Diskette drive	DUA2
Mass storage on remote system	ESA0
Tape	MUA0

To change the default boot device:

1. Check to be sure the system is in console mode. If the console prompt (>>>) does not appear on the screen, press the halt button on the rear of the VAXstation 2000 system unit.
2. At the console prompt, type **TEST 51**, then press RETURN.
3. Since no boot device has been selected yet, the following is displayed:

```
... ? >>>
```

Type the name of the default boot device and press RETURN. Table 1-5 contains a list of default boot device names.

To change the default boot device to another device, type in the new boot device name and press RETURN. To change the default boot device back to no default boot device, type in a period (.) and press RETURN.

Note: If you type in a boot command, the defaults will not apply.

How to Set the Default Boot Flags

The default boot flags are used to fine-tune the operating system. DIGITAL sets these flags to 0. Consult your operating system documentation for VMS and ULTRIX for more information.

To set the default boot flags:

1. Check to be sure the system is in console mode. If the console prompt (>>>) does not appear on the screen, press the halt button on the rear of the VAXstation 2000 system unit.
2. At the console prompt, type **TEST 52**, then press RETURN.
3. Set the default boot flags for the operating system that you have.

How to Set the Default Recovery

During manufacture, your system is set to automatically start up the operating system software every time you power up or in the event of an operating system software crash. To change this recovery action setting, follow these steps.

Note: Check your software documentation for shutdown procedures before halting your system.

1. Put the VAXstation 2000 in console mode by pressing the halt button on the rear of the system.
2. At the console prompt (`>>>`), type `TEST 53`, then press RETURN.
If the system is already set to reboot automatically, the following is displayed:

```
2. ? >>>
```

3. Press RETURN at the console prompt if you want to retain this setting.
If 3 is displayed instead of 2, your system is set to halt automatically after every power up. If you want to change from automatic halt to automatic reboot, type 2 at the console prompt and press RETURN. If you want to automatically RESTART should the system go down, type 1 at the console and press RETURN.
4. If you want your system to halt after every power up, type 3 at the console prompt and press RETURN.

In this case, your system will display the console prompt after every power-up sequence, and you must type `BOOT` (or `BOOT` followed by the device name of the device containing operating system software) every time you power up.

How to Connect the ThinWire or Standard Ethernet

You can connect your VAXstation 2000 to a network either through ThinWire Ethernet or standard Ethernet.

After completing the procedures in this guide, refer to the *Workstations and MicroVAX 2000 Network Guide* for information on connecting ThinWire Ethernet.

Where to Go from Here

How to Install the Operating System Software

Before connecting the operating system software, you should do the following:

1. Check with your system manager to be sure you need to install the operating system software on the fixed disk in your VAXstation 2000 system unit or expansion box. If you will be using the operating system on a *host system* through ThinWire Ethernet, you will not need to install the operating system software.
2. Properly format any fixed disks as instructed in *How to Format the Fixed Disk*.
3. Choose the default boot device as instructed in *How to Set the Default Boot Device*.
4. Read the chapter (Operating the VAXstation 2000) in this manual to learn about system operation.
5. For systems using the ULTRIX operating system, be sure to set any printers for 7-bit ASCII. (Refer to the documentation that shipped with those devices.)

To install the VMS or ULTRIX operating system software on the VAXstation 2000, follow the operating system software installation instructions that were shipped in the software carton. During the software installation, the operating system software is transferred from the installation media (tape cartridges or diskettes) to a fixed disk in the VAXstation 2000 or expansion box. If you use the tape cartridges or diskettes, you must have a tape drive or diskette drive installed on the VAXstation 2000.

You may also *down-line load* the operating system software from another VAXstation 2000 over the Ethernet network onto your fixed disk. For information about down-line loading the VMS operating system software, refer to the *VAX/VMS Guide to Ethernet VAXclusters*. For information about down-line loading the ULTRIX operating system software, refer to

the *ULTRIX-32 Network Management Guide* and *ULTRIX-32 Basic Installation Guide for the VAXstation 2000*.

Related Documents

For a list of related documents and their order numbers, see Appendix B (Related Documentation).

1. The first part of the paper is devoted to a discussion of the various methods of determining the rate of reaction. The second part is devoted to a discussion of the various methods of determining the order of reaction. The third part is devoted to a discussion of the various methods of determining the activation energy of a reaction.

7

7

7

Operation

**Insert tabbed
divider here.
Then discard
this sheet.**



1000
1000
1000
1000
1000



Chapter 2

Operating the VAXstation 2000

This chapter describes how to operate the VAXstation 2000 and its mass storage devices. Review this chapter before installing operating system software. Descriptions and operating information are included for the following:

- Enclosure
- Controls and indicators
- *Fixed disk drives*
- *Diskette drive and diskettes*
- Expansion adapter
- Expansion boxes
- *Tape drive and tape cartridges*

Setting Up and Handling the VAXstation 2000

Use Chapter 1 to set up and test your system when you first receive it and any time you move the system from one location to another. Chapter 1 describes setting up each system unit and expansion box either on its bottom or on its side. This manual describes and illustrates each system unit and expansion box bottom-side-down only; system operation is the same for either orientation.

Graphic symbols, called icons, are molded into the back of the system unit enclosure. They identify the locations of connectors and controls.

On the rear of the system unit (Figure 2-3) and each expansion box is a cable-restraining bar that relieves strain on cables installed. That bar may be used as a handle when carrying the system unit or expansion boxes.

Caution! Do not set the system unit or expansion boxes on their fronts. That procedure may damage the drive doors on the front of the boxes.

Be sure to turn off the VAXstation 2000 before lifting or moving it. Dropping or jarring the system unit or an expansion box can damage a

fixed disk drive and lose *data* stored on that *disk*. This is especially true when power is applied to the system and the drive is active.

Do not plug or unplug the power cable while the system unit is on.

Controls and Indicators

The VAXstation 2000 system unit contains the following controls (see Figures 2-1 to 2-3 and Table 2-1):

- System on-off switch
- Halt button

In addition, the system unit and optional expansion boxes may contain the following controls and indicators:

- Red light on RX33 diskette drive
- Load/unload pushbutton with integral red light on TK50 tape drive
- Green light on TK50 tape drive

Figure 2-1: System Unit On-Off Switch and Diskette Drive Light

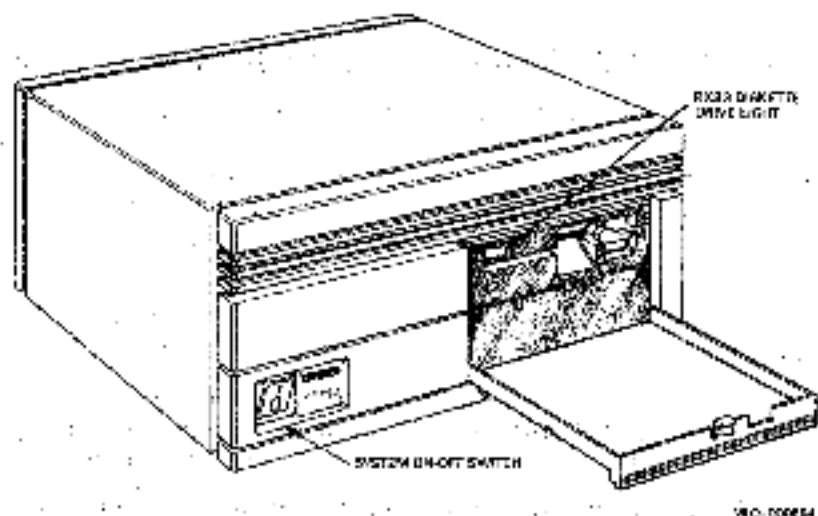
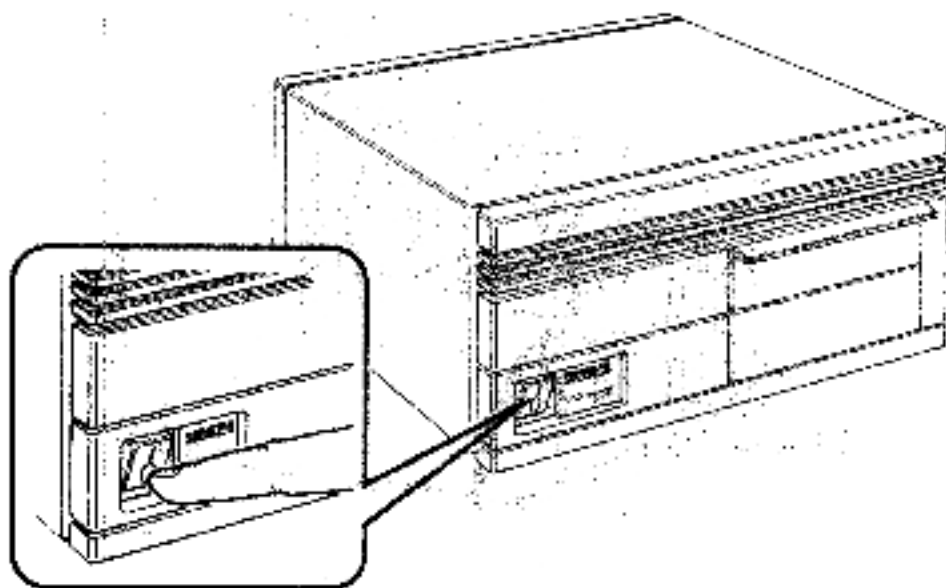


Figure 2-2: Setting On-Off Switch to 0



WLD-000641

Figure 2-3: Halt Button—Rear of System Unit.

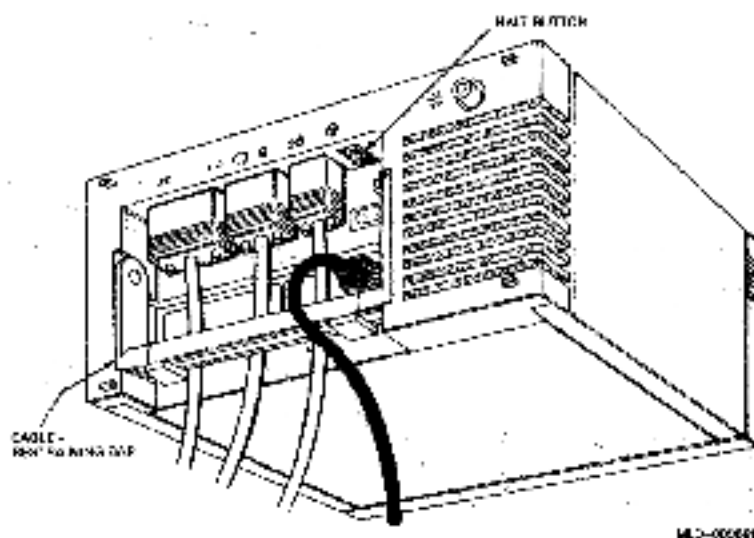


Table 2-1: Controls and Indicators

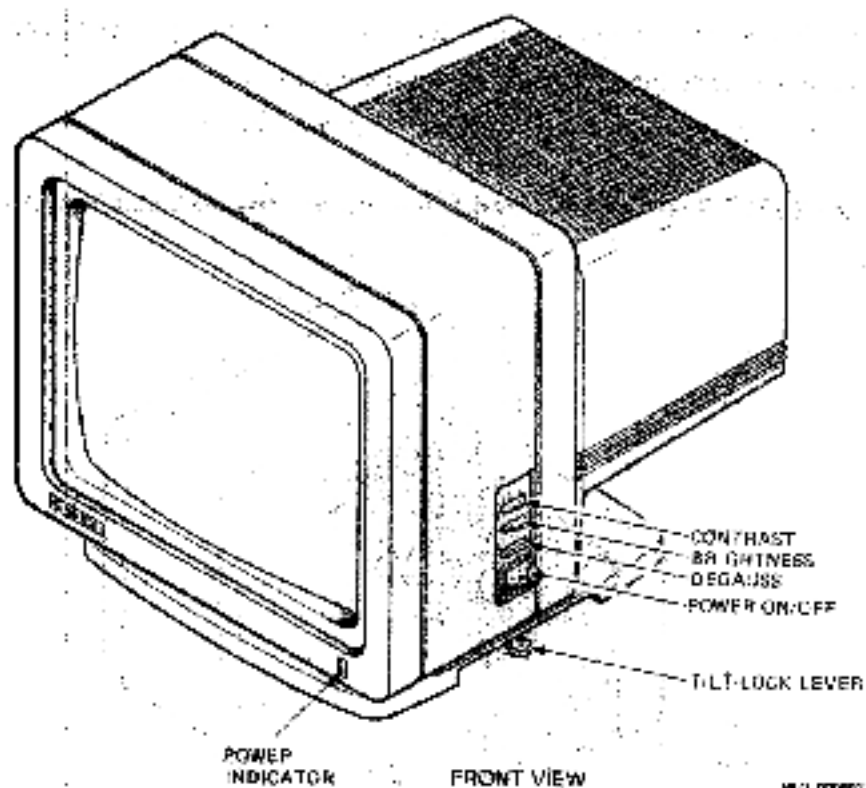
Control or Indicator	Function
System on/off switch	Controls ac power. Setting this switch to 0 (see Figure 2-2) turns off system power. Setting the switch to 1 turns on the power. The expansion box has its own on-off switch.
Halt button	Stops the normal operation of any software and puts the system in <i>console mode</i>. See Figure 2-3. The halt button is a momentary-contact pushbutton. Console mode lets the user control system functions that are usually controlled by operating system software. When the VAXstation 2000 is in console mode, the user types commands at the console prompt (<code>>>></code>). The halt button and console commands are discussed further in this manual. Note: Pressing the halt button may cause unsaved data to be lost. See your software documentation for more information.
Diskette drive light	Glow red when the drive is active.
Tape drive with pushbutton integral red light	This load/unload button controls the loading and unloading of tape cartridges. This button is described in detail later in this chapter.
Tape drive green light	Glow steadily to indicate either that the tape drive is ready for use or that the tape has been successfully loaded. This light is described in detail later in this chapter.

VR290 Color Monitor Controls and Indicators

The front and right side of the VR290 color monitor have the following controls and indicators (Figure 2-4):

- Contrast control—lets you adjust the video display's contrast.
- Brightness control—lets you adjust the brightness of the video raster (background brightness) to compensate for ambient light in the room.
- Degauss switch—lets you clear picture distortion caused by external magnetic interference. Press the degauss switch after moving the monitor on the tilt-swivel base to correct color distortions. If you need to press the degauss switch a second time, wait 10 minutes to allow the circuit to reactivate.
- Power switch—lets you turn the monitor on or off. Press 1 to turn on the power. Press 0 to turn off the power.
- Tilt-lock lever—lets you adjust the angle of the monitor. Set the tilt lock lever back to adjust the tilt. Pull the lever forward to the original position to lock the monitor at the desired angle. The lock prevents the tilting mechanism from moving the monitor. You can swivel the monitor on the base, and the angle will be maintained.
- Power indicator—glows green when power is applied to the monitor.

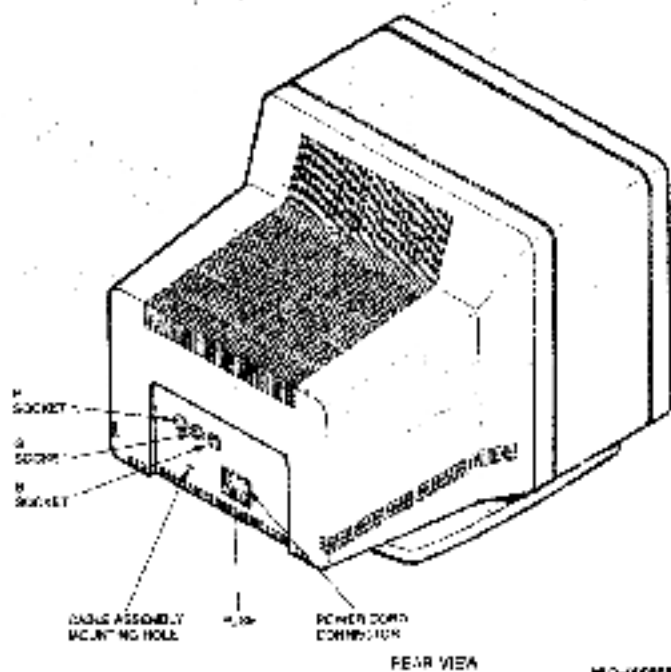
Figure 2-4: Controls and Connectors, VR290 Color Monitor



The rear of the monitor (Figure 2-5) has the following:

- R, G, B sockets—for the video cable connector.
- Cable assembly mounting hole—for attaching the video cable assembly.
- Fuse—protects the monitor from electrical damage.
- Power cord connector—for the monitor power cord.

Figure 2-5: Rear Controls and Connectors, VR290 Color Monitor



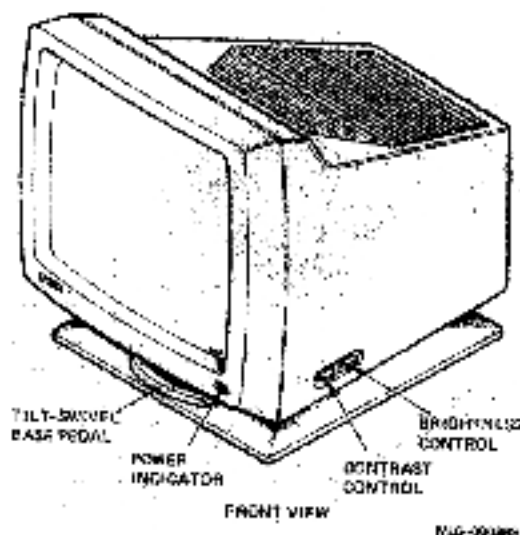
VR260 Monochrome Monitor Controls and Indicators

The front and side of the VR260 monochrome monitor have an indicator and two controls (Figure 2-6):

- Power indicator—glows green when power is applied to the monitor.
- Contrast control—lets you adjust the contrast of the video display.
- Brightness control—lets you adjust the brightness of the video raster (background intensity) to compensate for ambient light in the room.

The pedal on the optional tilt-swivel base lets you adjust the angle of the monitor. To change the angle, press down the base pedal and move the monitor to the desired angle. Taking your hand off the pedal locks the monitor in place. You can swivel the monitor on the base, and the angle will be maintained.

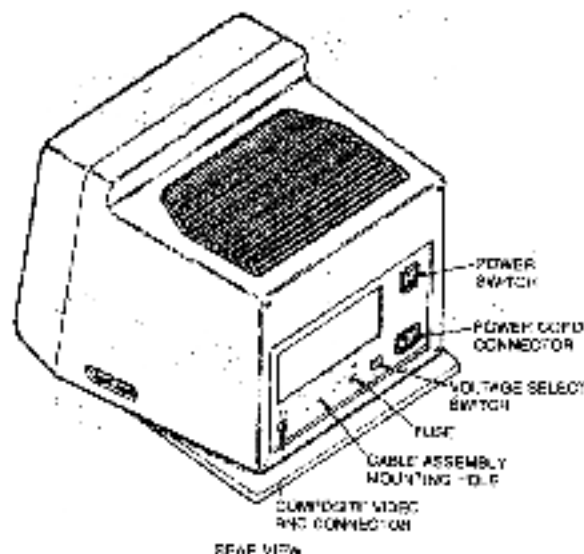
Figure 2-6: Front and Right Side Controls, VR260 Monochrome Monitor



The rear of the monitor has the following six connectors and controls (Figure 2-7):

- On-off switch—lets you control ac power to the monitor. Press 1 to turn on the power. Press 0 to turn off the power.
- Power cord connector—for the monitor power cord.
- Voltage select switch—lets you match the monitor operating voltage to the ac line voltage.
- Fuse—protects the monitor from electrical damage.
- Cable assembly connector—for attaching the video cable assembly from the video cable.
- Composite video connector—for the video cable from the video cable assembly.

Figure 2-7: Rear Controls and Connectors, VR280 Monochrome Monitor

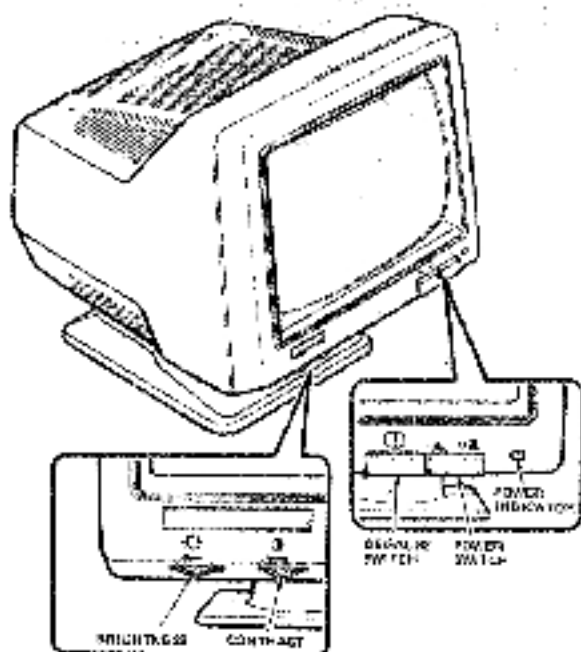


VR160 Color Monitor Controls and Indicators

The front of the VR160 color monitor has the following controls and indicators (Figure 2-8):

- Brightness control—lets you adjust the video raster (background intensity) to compensate for ambient light in the room.
- Contrast control—lets you adjust the video display to a suitable intensity.
- Degauss switch—lets you clear the color picture distortion caused by external magnetic interference.
- Power on-off switch—lets you turn the monitor on and off. Press the switch in to turn on the power. Press the switch out to turn off the power. Turn off the monitor at the end of the workday to extend the life of the monitor.
- Power indicator (green)—turns on to indicate the presence of power. Turns off to indicate the absence of power.

Figure 2-8: Controls and Indicators, VR160 Color Monitor

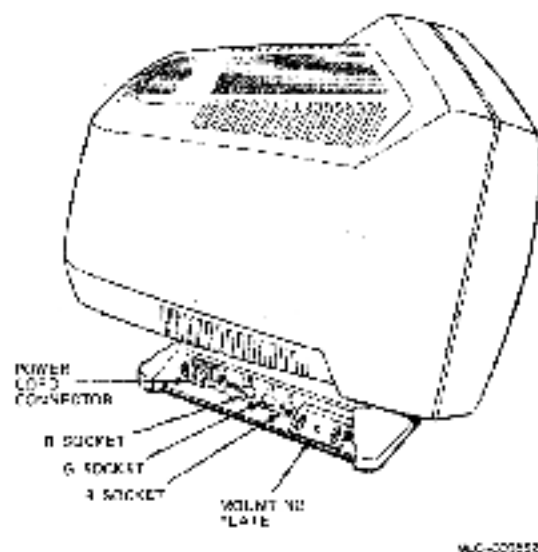


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The rear of the monitor (Figure 2-9) has the following:

- R, G, B sockets—for the video cable connector.
- Cable assembly mounting shelf—for attaching the video cable assembly.
- Power cord connector—for the monitor power cord.

Figure 2-9: Rear Connectors, VR160 Color Monitor

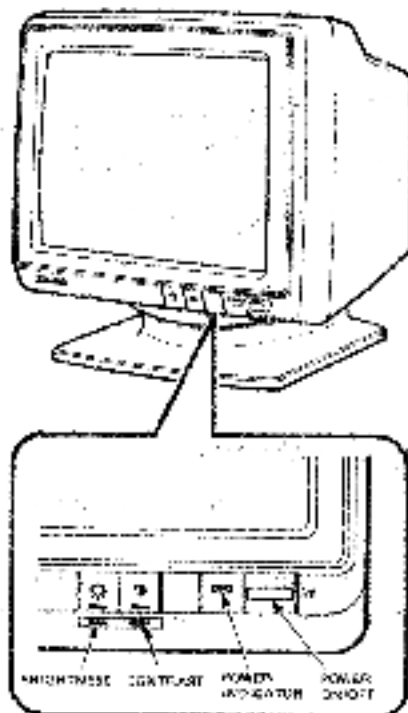


VR150 Monochrome Monitor Controls and Indicators

The front of the VR150 monochrome monitor has an indicator and the following controls (Figure 2-10):

1. Brightness control—lets you adjust the video raster (background intensity) to compensate for ambient light in the room.
2. Contrast control—lets you adjust the video display to a suitable intensity.
3. Power switch—lets you turn the monitor on and off. Press the switch in to turn on the power. Press the switch out to turn off the power. Turn off the monitor at the end of the workday to extend the life of the monitor.
4. Power indicator (green)—turns on to indicate the presence of power. Turns off to indicate the absence of power.

Figure 2-10: Front Controls, VR150 Monochrome Monitor

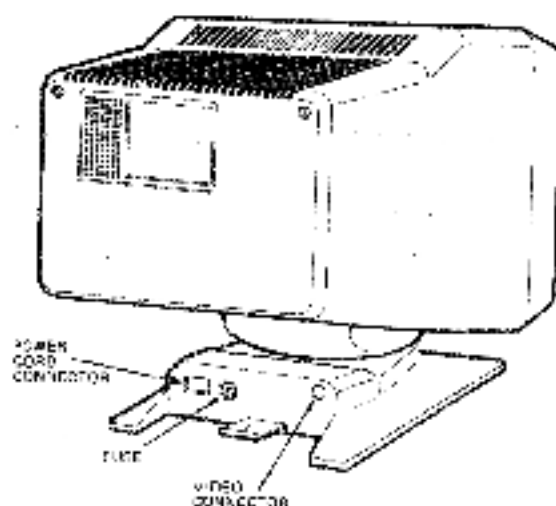


VR150-00002

The rear of the monitor has the following connectors and controls (Figure 2-11):

- Power cord connector—for the monitor power cord.
- Cable assembly shelf—for attaching the video cable assembly from the video cable.
- Composite video connector—for the video cable from the video cable assembly.

Figure 2-11: Rear Connectors, VR150 Monochrome Monitor



400-00004

Powering Up the System

Before powering up the system, install it according to the instructions in Chapter 1.

Note: If operating system software is not installed in the VAXstation 2000, use the documentation that came with your software to complete the installation.

1. Set the monitor on-off switch to 1 (on).
2. Power up any expansion boxes and peripheral equipment, such as the printer.
3. Set the system unit on-off switch to 1 (on).

After about 20 seconds, the monitor displays the power-up test sequence.

Note: Important messages are displayed during power up. Read the rest of this section for information on the screen display.

A sample power-up display is shown in Figure 2-12.

Caution: Do not power down the VAXstation 2000 until power-up testing is complete. Wait until you see either the console prompt (>>>) or the first screen of your operating system software. Powering down before testing is complete may destroy data in the system's nonvolatile random-access memory.

Caution: Power up any expansion boxes before powering up the system unit so that any tapes or disks can be included in the configuration.

Table 2-2 lists the system's normal power-up indications. The table includes indicators on optional equipment as well. Your system may not contain all the listed devices.

Table 2-2: Normal Power-up Indications

Indicator	Normal Indication
Monitor power indicator	Glow green
Diskette drive light on system unit	Glow red
Tape drive load/unload button on expansion box	Glow red for approximately 4 seconds and then goes out

Note: The fan in the system box goes on at power up. You may be able to hear it if the room is quiet. You can feel the exhaust from the vents on the rear of the system unit.

If you do not observe the indications listed in Table 2-2, see Chapter 3.

Figure 2-12: Sample Power-up Display

```
KA410-B V2.2
F...E...D...C...B...A...9...8...7...6...5...4...3...2...1...
83 BOOT SYS
-DUA2
-DUA0
```

The power-up test sequence is displayed each time the VAXstation 2000 is turned on. The display consists of a countdown from the letter F to the number 1. Then the screen clears for a few seconds. The *device names* of one or more mass storage devices (if present) are shown (DUA2 and DUA0, for example, in Figure 2-12). The last item on the list identifies the VAXstation 2000 mass storage device that contains *bootable software*. If the last line on the list is MUA0, the VAXstation 2000 is booting from the tape drive. If the last line of the display is ESA0, the VAXstation 2000 is searching for bootable software over the *Ethernet*.

If the system cannot locate any bootable software, one of two things happens. An *error message* may be displayed:

```
%VMB-P-ERR. PC = 00000000
%VMB-I-STS. RC = 00000000

84 FAIL
>>>
```

Or, if your system is part of a Local Area VAXcluster, the system may continue to search the Ethernet for bootable software. In this case, the system displays the following message:

```
?54 RETRY
```

and no console prompt is displayed. If this happens, press the halt button. The console prompt is then displayed. Type **BOOT** at the console prompt (>>>) or **BOOT** followed by the name of the device that contains operating system software and press **RETURN**.

An underscore following a number in the countdown sequence indicates that the corresponding optional *hardware* has not been included in your system.

Note: If any number in the countdown sequence has a question mark or an asterisk beside it, as shown in Figure 2-13, a fault in the system may exist. See Chapter 3 for more information.

Figure 2-13: Sample Power-up Display with Error Message

```
KA410-B V2.2
F...E...D...C...B...A...9...8...7...6...5...4...3...2...1?...

83 BOOT SYS
-DUAD

%VMB-F-ERR. PC = nonnnnnb
%VMB-I-STS. EC = nnnnnnnn

84 FAIL
>>>
```

As described in Chapter 1, the VAXstation 2000 displays a request for keyboard language selection the first time the system is powered up. This display follows the power-up display automatically, and the system records your choice in memory. Under normal operating conditions, you only need to make this choice the first time you power up the VAXstation 2000. However, certain kinds of failures (such as a discharged battery) or maintenance procedures may erase memory, and the first power up after such an occurrence displays the keyboard language request. Additionally, Chapter 3 contains a procedure for changing the keyboard language.

When the first screen display for the operating system software appears, the system is ready for use. Refer to the software documentation for instructions on using the VAXstation 2000 software.

See Appendix B for a list of related documents.

Powering Down the System

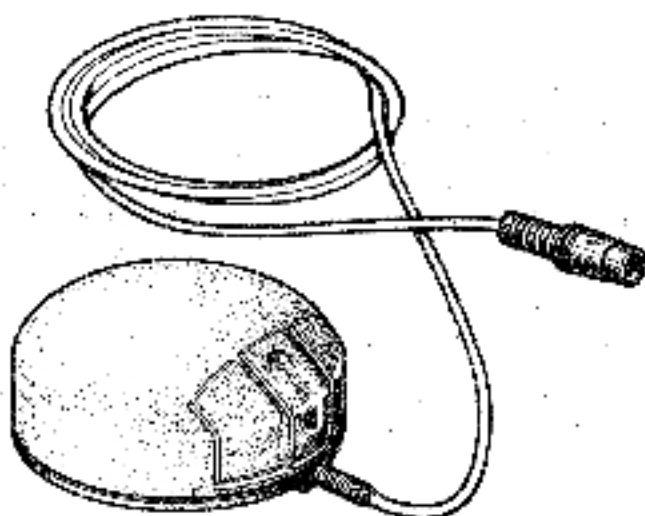
To save data and to ensure an orderly system shutdown, follow the shutdown procedure described in your operating system software documentation. After completing an orderly system shutdown, turn off the system in the following order:

1. Monitor
2. Other peripheral equipment, such as a printer or modem
3. Expansion boxes
4. VAXstation 2000 system unit

Mouse

Use the *mouse* (Figure 2-14) to control movement of a pointer on the monitor screen and to perform other functions determined by the *workstation software* you are using. Use the mouse by moving it across the desktop and pressing or clicking one of the three buttons. The documentation that accompanies your workstation software explains how to use the mouse.

Figure 2-14: Mouse



H. J. GARDNER

Fixed Disk and Diskette Drives for the System Unit

When you lower the drive door on the front of the VAXstation 2000 system unit, you find one of the following configurations:

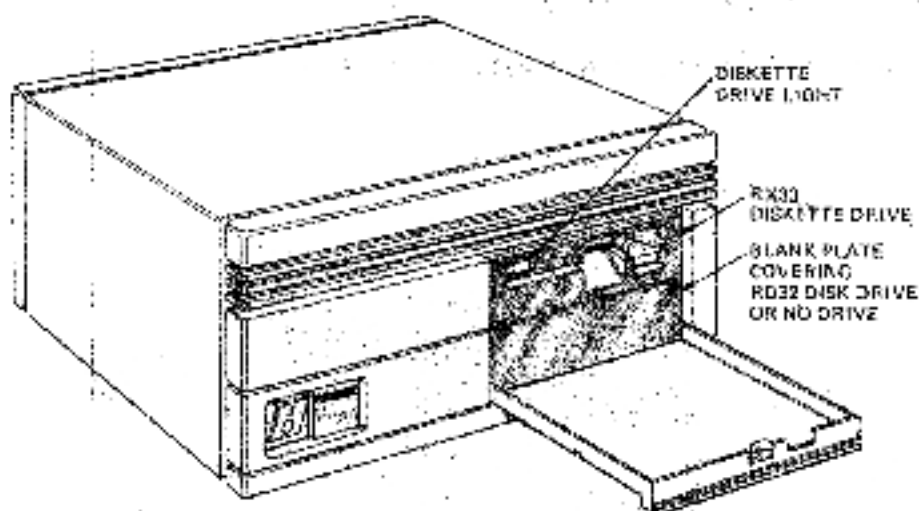
1. An RX33 diskette drive (Figure 2-15) with a lever and slot in the upper portion of the opening and a blank metal plate in the lower portion.

The RX33 diskette drive uses double-sided, high-density removable RX33K diskettes. Up to 1.2 megabytes of data can be stored on each RX33K diskette (.6 megabytes a side). The RX33 diskette drive also uses single-sided normal-density RX50K diskettes. Up to .4 megabytes of data

can be stored on each RX50K diskette. The RX33 diskette drive is a half-height (approximately 1 5/8 in high) device.

The blank metal plate may cover an RD32 fixed disk drive. The RD32 stores up to 40 megabytes of data on a nonremovable disk. The RD32 is a half-height device. The metal plate covers the empty cavity if an RD32 is not present.

Figure 2-15: Configuration with RX33 Diskette Drive and RD32 Fixed Disk Drive



2. Two blank metal plates covering the opening (Figure 2-16). The plates cover one of the following possible configurations:

- An RD53 fixed disk drive

The RD53 fixed disk stores up to 71 megabytes of data and is sealed in place and cannot be removed. The RD53 can be used in the system unit or in the expansion box. The RD53 is a full-height (approximately 3 1/4 in high) device.

- No fixed disk drive

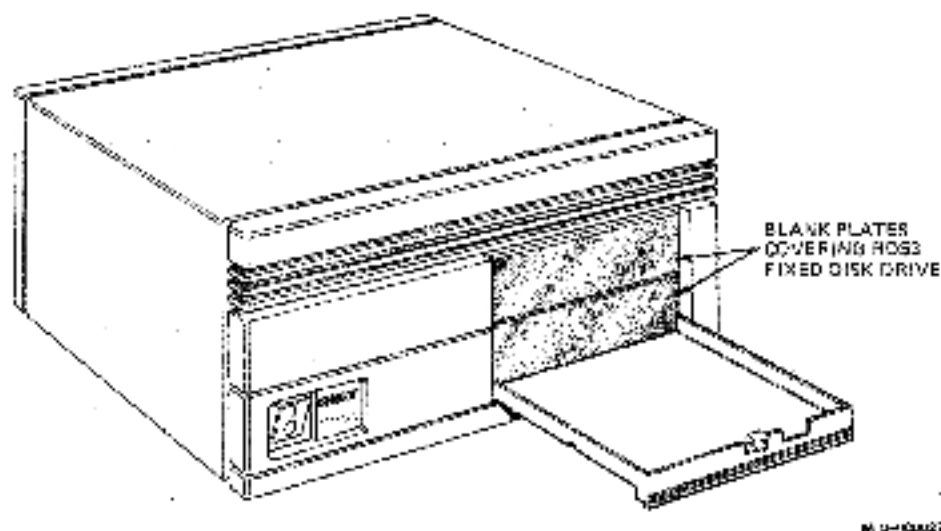
If your VAXstation 2000 is part of a cluster (a group of computers networked together), you can use devices that reside on other systems

to store your software and data. See your software documentation and the *Workstations and MicroVAX 2000 Network Guide* for more information.

3. Another possible configuration is the RD54 fixed disk drive which has a drive select LED on its front.
 - The RD54 fixed disk stores up to 159 megabytes of data. The RD54 can be used in the system unit or in the expansion box. The RD54 is a full-height (approximately 3 1/4 in high) device.

To find the model number of the fixed disk drives in your system, see The Fixed Disk Verifier in Chapter 3.

Figure 2-16: Configuration with Blank Plates



Diskettes

The RX33 diskette drive magnetically stores data on removable diskettes. Each RX33K diskette (Figure 2-17) is permanently enclosed in a gray plastic jacket. When a diskette is inserted into the diskette drive and the drive is active, the diskette spins inside the jacket. The read/write head of the diskette drive contacts the diskette through the openings in the jacket. The

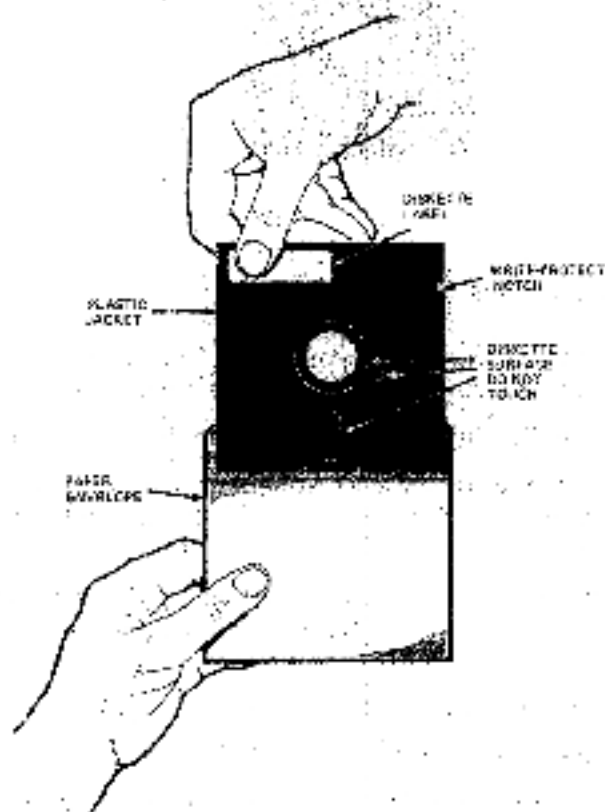
diskette drive contacts the diskette through the openings in the jacket. The fabric lining of the jacket continuously cleans the diskette. Do not attempt to remove the diskette from its jacket.

The RX33 diskette drive accepts RX50K diskettes as well as RX33K diskettes, but the RX50 has less storage capacity than the RX33.

Note: You cannot use an RX33 diskette on an RX50 diskette drive.

An RX50K diskette can be distinguished from an RX33K diskette by its black plastic jacket with a printed orange arrow. RX50K diskettes are preformatted.

Figure 2-17: RX33K Diskette



2-10-00000

Write-protecting Diskettes

Both RX33K and RX50K diskettes have a *write-protect* feature to prevent accidental overwriting. To protect data, cover the *write-protect notch* on the side of the plastic jacket with one of the adhesive foil tabs supplied with your diskettes (Figure 2-18). Remove the tab when you want to add, change, or delete information on the diskette.

Figure 2-18: The Diskette Write-protect Tab



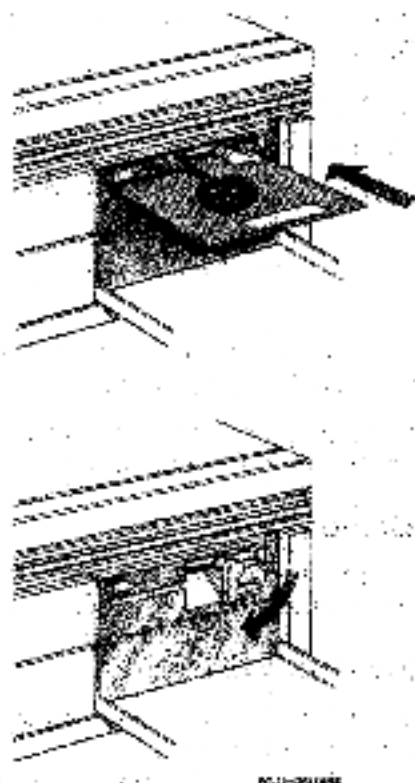
W.D. 000357

Inserting Diskettes

1. Open the door on the front panel of the VAXstation 2000 system unit. Inside is a lever that lets you insert and remove a diskette.
2. Make sure that the light on the front of the drive is not lit.
3. If the lever on the front of the drive is in a vertical position, move it counterclockwise to horizontal (Figure 2-19) and remove the diskette that is in the drive.
4. Remove the diskette to be inserted from its paper envelope. Hold the diskette so that the write-protect notch is to your left and the diskette's label is up.
5. Push the diskette into the slot until it snaps into place.
6. Move the lever clockwise to its vertical position.

Note: Do not force the lever. Make sure that the diskette is fully inserted. The diskette drive lever must be in a vertical position for the drive to function.

Figure 2-19: Inserting Diskettes



Removing Diskettes

Before removing a diskette, check the light on the front of the drive. If the light glows red, the drive is active. Do not attempt to remove a diskette when the drive is active, or the diskette may be damaged. Once the light is off, move the lever to the horizontal position and remove the diskette.

Note: During software installation, the light may remain lit when the drive is not active. Follow the instructions in your software documentation in this case.

Handling and Storing Diskettes

Incorrect handling and storing of diskettes can damage them and cause loss of data. In turn, damaged diskettes can damage the diskette drive. The following precautions should be taken:

- Keep diskettes in paper envelopes when not in use.
- Do not fold or bend diskettes.
- Do not touch the exposed surface of diskettes. Handle only the top (label area) of diskettes.
- Store diskettes vertically. To prevent warping, avoid tightly packing diskettes.
- Use only a felt-tip pen when labeling diskettes. The pressure of a sharp instrument, such as a pencil or pen, can damage diskette surfaces.
- Store diskettes away from heat and magnetic fields (such as those produced by motors, transformers, and *video terminals* and monitors).

Making Backup Copies

Use the diskette drive to make backup copies of files that you have stored on a fixed disk. Refer to your software documentation for instructions.

Formatting RX33K Diskettes

You must format each RX33K diskette before using it for the first time. Formatting prepares the diskette to accept data. The process consists of inserting the diskette in the drive and typing commands while in console mode. Formatting a diskette takes about 2 minutes.

Note: RX50K diskettes are preformatted and do not require any preparation for use. Formatting an RX33K diskette that has already been formatted destroys data that may be stored on that diskette.

See the *VAXstation 2000/MicroVAX 2000 Operations Guide* for formatting procedures for systems containing VMS operating system software.

1. Check your software documentation for shutdown instructions before you halt the system.
2. Put the system into console mode by pressing the halt button on the rear of the system.
3. Remove from its paper envelope the diskette that you intend to format.

4. Be sure that the diskette is not write protected. (See Write-protecting Diskettes in this chapter.)
5. With the diskette's label up and the write-protect notch to your left, insert the diskette until it snaps into place. Move the lever clockwise to its vertical position.

Note: Do not force the lever. The diskette must be fully inserted in the drive for the lever to move freely.

6. Put the system into console mode by pressing the halt button on the rear of the system unit.
7. Type TEST 70 and press RETURN at the console prompt (>>>). The following text appears on the monitor screen:

```
KA410-3 BDRXfmt
VSfmt_QUE_unitno (0-2) ?
```

8. Type the number 2 and press RETURN. (The number 2 always represents the RX33 drive.)

Caution: Type only the number 2. Typing 0 or 1 starts up the hard disk formatter, which may result in loss of software and data on the hard disk.

If the following text appears, you must start over with the TEST 70 command at the console prompt:

```
VSfmt_RES_ERR #1
84 FAIL
>>>
```

If you continue to get the error message, see Chapter 3 for information on isolating and solving problems.

The following text appears if no errors occur:

```
VSfmt_QUE_RXnedtyp
(1=RX33) ?
```

9. Type 1 and press RETURN. Any other number causes the following text to be displayed:

```
VSfmt_RES_Err #6  
84 FAIL  
>>>
```

This message is also displayed if you have mistakenly inserted an RX50K diskette, which is preformatted and should not be formatted in the VAXstation 2000. The message also indicates that no diskette was inserted in the drive, or that the drive lever was not moved to the vertical position.

Start over with the TEST 70 command at the console prompt after this error.

The following text appears next if no errors exist:

```
VSfmt_QUE_RUsure (DUA2 1/0) ?
```

10. Type the number 1 and press RETURN to continue. The following message appears slowly:

```
VSfmt_STS_Pnting .....OK  
VSfmt_STS_CkRfmt .....OK  
VSfmt_RES_Succ  
>>>
```

The diskette has been successfully formatted and can now be used to store data.

If for any reason you do not want to continue, type the number 0. If you see any device number other than DUA2 in the text, type the number 0. When you do this, you see the following message:

```
VSfmt_RES_Abtd  
84 FAIL  
>>>
```

The formatter has now stopped. You must start at the beginning of the procedure when you are again ready to format a diskette.

If an error occurred during formatting, one of the following messages appears:

```
VSfmt_RES_ERR #3  
84 FAIL  
>>>
```

or

```
VS_RES_ERR #5  
84 FAIL  
>>>
```

Try formatting the diskette again. If that is unsuccessful, try another diskette. If you continue to see either error message, see Chapter 3 to isolate and solve the problem.

Formatting Fixed Disks

Before data can be stored on a fixed disk, the disk must be formatted, which prepares the disk to accept data.

Formatting the fixed disk is explained in Chapter 1. However, it may be necessary to reformat the disk after repair, replacement, or corruption of the data stored on that disk. If you want to determine whether your disk is already formatted, see The Fixed Disk Verifier in Chapter 3.

Caution: Reformatting a disk destroys stored software and data. Back up your disk before reformatting.

To format your fixed disk, follow these steps.

1. At the console prompt (>>>), type **TEST 70** and press RETURN. The following text appears on the monitor screen:

```
KA410-R RDRXfmt  
VSfmt_RQE_unitno (0-2) ?
```

2. Type the number **0** for a fixed disk drive in the system unit. Type the number **1** for a fixed disk drive in the expansion box.

If everything is working normally, the following text appears:

```
VSfmt_STS_Siz
```

If you type an invalid number, the following text appears:

```
VSfmt_RES_ERR #1
```

If this happens, start over at the first step. If you continue to see the error message, turn to Chapter 3 for information on isolating and solving problems.

If no error occurs, you see the following sample text as the formatter program determines the type of fixed disk drive you have selected for formatting:

```
VSfmt_STS_Siz ..... RD32
```

In this case, the formatter has identified the disk drive as an RD32.

If you see the following error message:

```
VSfmt_STS_Siz ..... ??
```

```
VSfmt_RES_Err #2
```

```
04 FAIL
```

```
>>>
```

the fixed disk drive or its controller may be faulty. Use Chapter 3 to troubleshoot the problem.

If no problem occurs with the drive, the following appears:

```
VSfmt_QUE_SerNbr (0-999999999) ?
```

Refer to the packing slip that came with your system shipment for the serial number of the fixed disk drive you are formatting. Enter only the numbers. If you cannot locate the serial number, assign a number of your choice to the drive. Be sure to record this number for later reference. Assign a different number to each drive you format.

3. Type the serial number of the disk and press RETURN.

The following is a sample of the text that appears:

```
VSfmt_QUE_RSure (000 1/0)?
```

Type the number 1 and press RETURN to continue. If for any reason you do not want to continue, type 0. If you do this, the following text appears.

```
VSfmt_RES_Abtd
```

```
04 FAIL
```

```
>>>
```

The formatter has now stopped. You must start at the first step when you are again ready to format a drive.

If you choose to continue, the following message appears gradually. It takes approximately 15 minutes to format an RD32 disk, 25 minutes to format an RD53 drive, and 40 minutes to format an RD54 drive.

```
VSfmt_STS_RdXbb .....OK
VSfmt_STS_Fmtng.....OK
VSfmt_STS_CbkPaa.....OK
VSfmt_RES_Succ
>>>
```

If you see this message in its entirety, the disk has been successfully formatted and is ready for use.

If a problem occurs, one of the following two messages appears:

```
VSfmt_STS_Fmtng.....??
VSfmt_RES_ERR #3
84 FAIL
>>>
```

or

```
VSfmt_STS_CkPa 1..... ??
VS_RES_ERR #4
84 FAIL
>>>
```

If you see either of these messages, refer to Chapter 3 for information on isolating and solving problems.

The Expansion Adapter

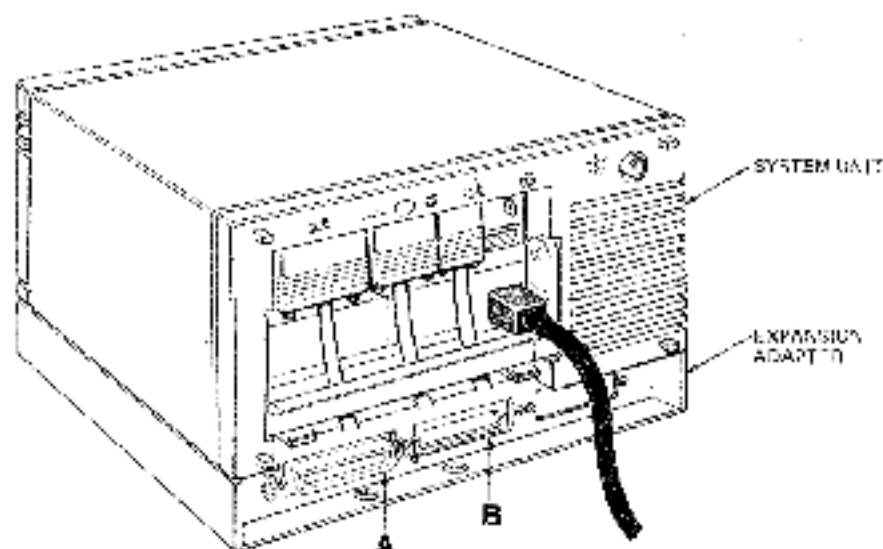
The expansion adapter (Figure 2-20) is an optional attachment for the VAXstation 2000 system unit that permits communication between the expansion box (Figure 2-21 and Figure 2-22) and the system unit.

If your system does not contain an expansion adapter and you want to connect an expansion box, call your service representative.

The expansion adapter contains two connectors: A and B. Those letters are stamped on the expansion adapter to identify the connectors. A is the connector for an expansion box containing a tape drive. B is the connector for

an expansion box containing a fixed disk drive. A third opening is covered by a metal plate and is not used by the VAXstation 2000.

Figure 2-20: The Expansion Adapter—Rear



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Expansion Boxes

Expansion boxes provide additional storage for the VAXstation 2000. A box can hold an RD53 fixed disk drive, an RD54 fixed disk drive, or a TK50 tape drive. You may use only one of each type in your system.

To connect an expansion box to the VAXstation 2000, an expansion adapter, BA40X-XX, must be installed on the bottom of the system unit. If you want to have an expansion adapter installed, contact your service representative. See Chapter 1 for expansion box installation information.

An expansion box has an on-off switch and drive door like the system unit. An expansion box containing a fixed disk drive has no power or status indicators visible. An expansion box containing a TK50 tape drive has two lights. More information about those indicators is supplied later in this chapter.

Caution: Only devices such as the RD53-Fx or RD54-Fx, which were specifically designed to operate with the VAXstation 2000, may be attached to connector B. Likewise, devices such as the RD53-Fx or RD54-Fx must not be connected to other systems for which they were not designed. Circuit damage and/or data loss may occur.

Figure 2-21: Expansion Box—Front

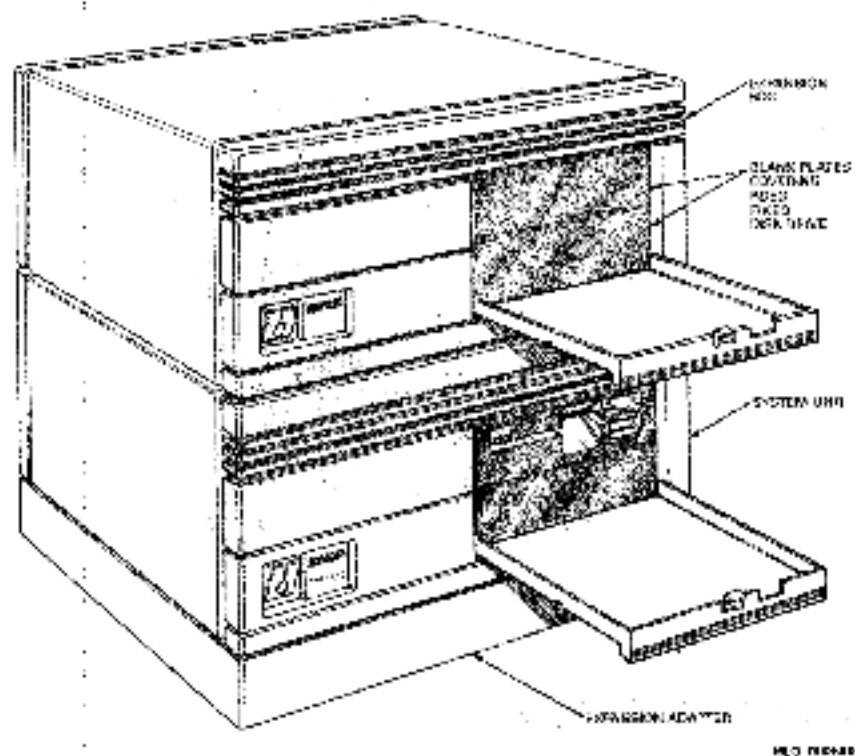
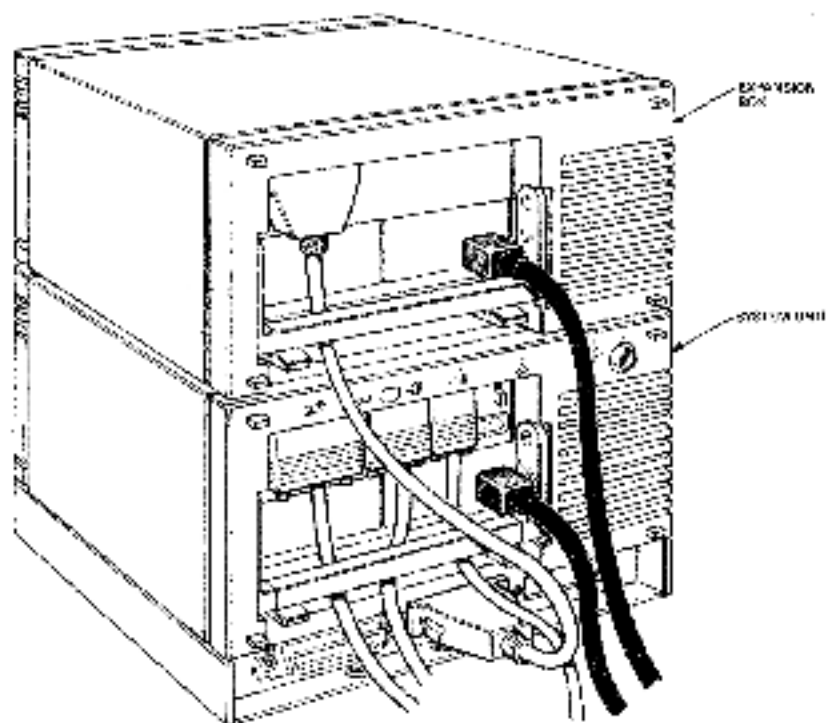


Figure 2-22: Expansion Box---Rear (Fixed Disk Drive Cabling Shown)



MED-000502

The TK50 Tape Drive

The TK50 tape drive (Figure 2-23) holds one removable *magnetic tape* cartridge. The tape cartridge stores up to 94.5 megabytes of data. Use the tape cartridge as an *input device* to load software or data or as an *output device* to make copies (or backups) of software or data.

The tape drive has two primary controls: the cartridge release handle and the load/unload button. The cartridge release handle allows cartridges to be inserted and removed and locked into position. The load/unload button controls winding and rewinding of tape. The In position is for loading tape cartridges. The Out position is for unloading tape cartridges.

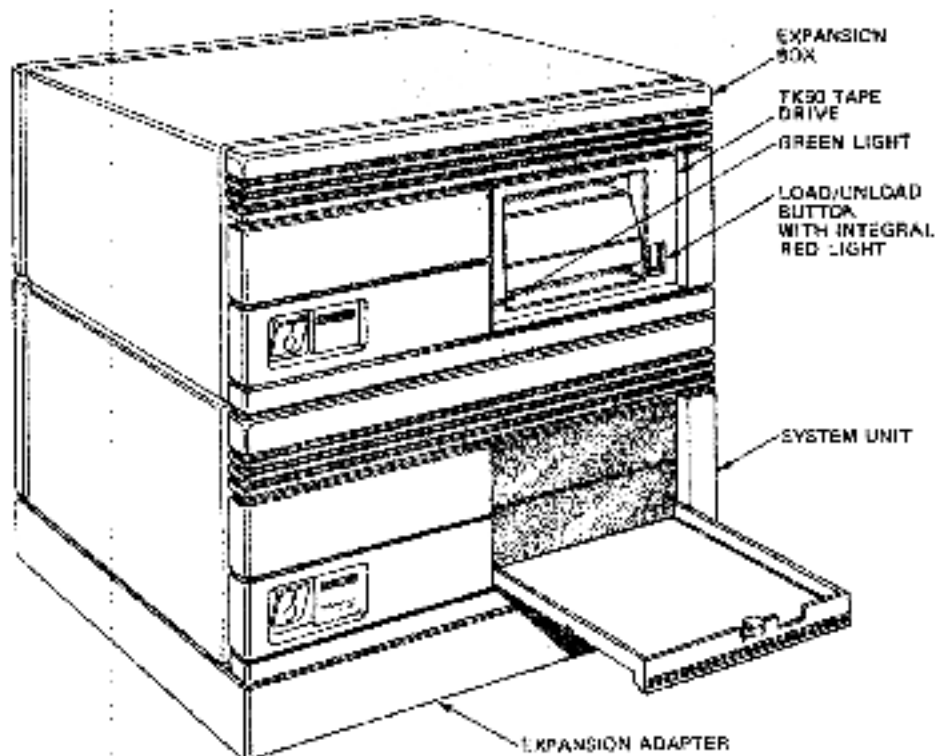
The drive also has two indicators:

- A red light that is integral to the load/unload button
- A green light on the left side of the drive
- When the system is powered up, one or both of those lights will be lit.

Those controls and indicators are described in Table 2-3.

Refer to the *TK50 User's Guide* for more information on the operation of the TK50.

Figure 2-23: Expansion Box with TK50 Tape Drive

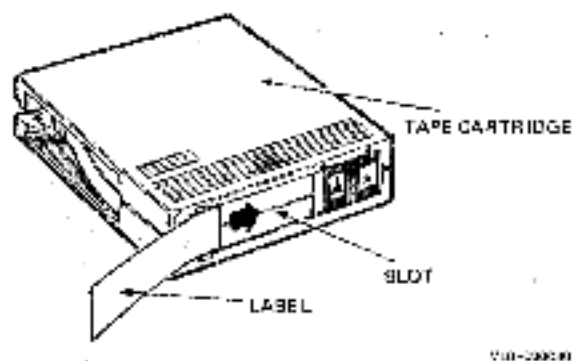


ML 7-00003

Labeling a Tape Cartridge

Always label cartridges. A slot for the label is provided on the front of the cartridge (Figure 2-24). This label is visible when the cartridge is in the drive. Labels or markings on any other part of the cartridge can interfere with proper operation of the drive. Do not write directly on the cartridge with pen or pencil.

Figure 2-24: Labeling

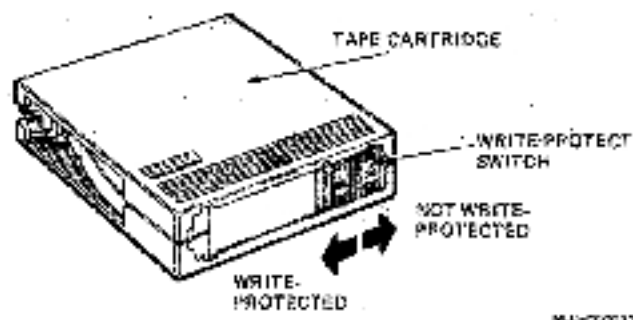


Write-protecting a Tape Cartridge

Write-protecting a tape cartridge prevents accidental erasure of information. Set the write-protect status with the 2-position switch on the cartridge (Figure 2-25). The VAXstation 2000 can read information on the tape regardless of the position of the *write-protect switch*. However, the VAXstation 2000 cannot write data to the tape when it is write protected.

When you use a cartridge to install software on the VAXstation 2000, make sure the write-protect switch on the front of the cartridge is set to write protect. The switch has two icons indicating the write-protect status. An orange rectangle is visible when the switch is in the write-protect position. If you do not see an orange rectangle, slide the switch toward the label slot.

Figure 2-25: Write Protecting a Tape Cartridge



Note: Early versions of the cartridges do not have the orange rectangle. Use the icons as guides.

When you use a cartridge to make a *backup copy* or to write out data, make sure the write-protect switch is set to enable writing to the tape. To enable writing, slide the switch away from the label slot until the switch locks in place.

Handling and Storing Tape Cartridges

- Do not touch the exposed surface of the tape.
- Do not throw or drop the tape cartridge. The impact can damage the cartridge.
- Let new tapes stabilize at room temperature for 24 hours before using them.
- Write on the identification label before putting the label on the tape cartridge. Place the label only in the label slot on the front of the tape cartridge.
- Store tape cartridges away from dust.
- Keep tape cartridges away from direct sunlight, heaters, and other heat sources. Store tape cartridges in an even temperature between 50 and 104°F (10 to 40°C). Store cartridges where the relative humidity is between 20 and 80%.
- Keep tape cartridges away from magnets and equipment that generates magnetic fields, such as motors, transformers, and video monitors and terminals.
- Keep tapes away from x-ray equipment.

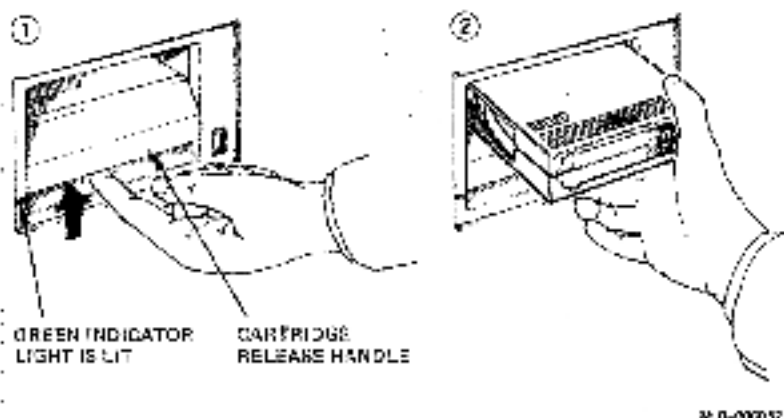
Inserting a Tape Cartridge

Make sure the load/unload button is in the Out (unload) position.

The load/unload button glows red for approximately 4 seconds during the tape drive automatic power-up test.

The red light goes off and the green light goes on, indicating that it is safe to move the cartridge release handle.

Figure 2-26: Lifting Release Handle and Inserting a Cartridge

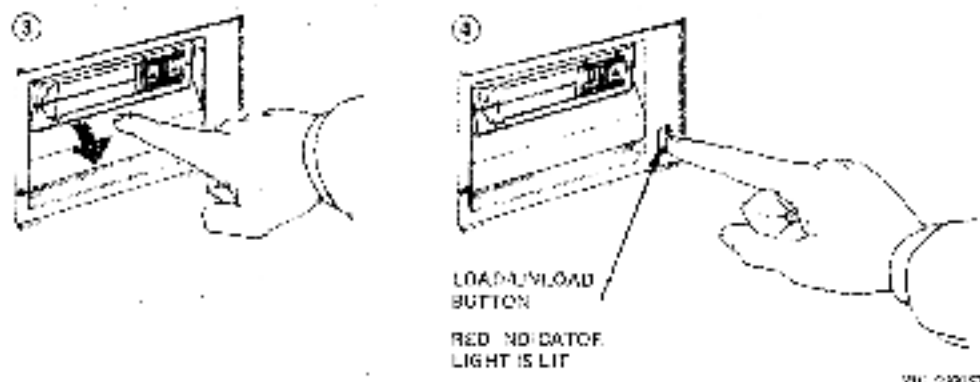


1. Pull up the cartridge release handle.
2. With the arrow on the cartridge facing up and pointing toward the drive, insert the cartridge into the 1K50 drive.

The red light goes on.

The green light goes off.

Figure 2-27: Pushing Release Handle and Pressing Load/Unload Button



3. Push down the release handle.

The red light goes off.

The green light goes on.

4. Push the load/unload button to the In (load) position.

The red light goes on.

The green light goes off.

The tape loads in 10–15 seconds. During loading, the two leaders couple and tape winds onto the take-up reel inside the tape drive.

The red light remains on.

When the green light also goes on, the tape is ready to use. Refer to your software documentation for further instructions.

Note: If a cartridge is new, the tape drive performs a calibration sequence that takes approximately 40 seconds. The green light flashes rapidly and irregularly during calibration.

Caution: Do not move the cartridge release handle unless the red light is off and the green light is on. Do not move the cartridge release handle while either light is flashing. If the red light flashes rapidly at any time, press the load/unload button four times. If the

problem persists, do not attempt to use the tape drive or remove the cartridge. Call your service representative.

Removing a Tape Cartridge

Tape cartridges must be unloaded (rewound and uncoupled) before being removed from the drive. Follow these steps:

Note: Rewinding a tape can also be done under software control. Refer to your software documentation for information.

1. Ensure that the tape drive is not active. The red light should be off and the green light on.
2. Press the load/unload button to the Out (unload) position.

The red and green lights flash slowly as the tape rewinds. This procedure may take up to 90 seconds.

The red light remains on and the green light goes off as the tape unloads into the cartridge.

When the tape is completely unloaded, the red light goes off and the green light goes on.

Caution: Lift the cartridge release handle only if the load/unload button is out, the red light is off, and the green light is on. Otherwise, damage to the tape cartridge and tape drive may result.

3. Pull up the cartridge release handle.
4. Remove the cartridge and store it in its plastic container.
5. Push down the cartridge release handle.

The green light remains on, showing that there is power to the drive and that you can safely move the cartridge release handle.

Caution: Remove the tape cartridge from the tape drive when the cartridge is not in use and before turning off the system. Leaving the cartridge in the drive may result in damage to the cartridge when power is turned off.

Summary of TK50 Controls and Indicators

Table 2-3: TK50 Controls and Indicators

Control	Position	Function
Load/unload button	In	Loads the tape (10-15 seconds).
	Out	Rewinds and unloads the tape.
Cartridge release handle	Up	Tells you insert or remove a tape after rewind and unload operations are completed.
	Down	Locks tape in operating position.
Green Light	Red Light	Function
Off	Off	No power to the tape drive.
On	Off	Safe to move cartridge release handle. Power is present.
Off	On	Do not move the cartridge release handle. One of the following is in effect: power-up test is occurring, cartridge is inserted but handle is still up, tape is loading or unloading, tape is stopped.
On	On	Tape loaded successfully.
Flashing	On	Tape is in motion (except rewind). Read/write commands are being processed. Irregular fast flashing means tape calibration is occurring.
Flashing slowly	Flashing slowly	Tape is rewinding.
Off	Flashing rapidly	A fault occurs. See Chapter 3.

Chapter 3

Troubleshooting

This chapter guides you through a troubleshooting procedure, suggests corrective actions, and explains how to use the *diagnostic* programs in the VAXstation 2000's *read-only memory (ROM)*. For more serious problems, contact your service representative.

Basic Troubleshooting

Use the troubleshooting flowchart to help you pinpoint a problem. The flowchart assumes that your VAXstation 2000 has been installed according to the instructions in Chapter 1.

If the problem with your VAXstation 2000 remains, call your service representative. Your sales representative will give you service information.

How to Use the Troubleshooting Flowchart

To determine the point at which your VAXstation 2000's problem occurs, follow these steps:

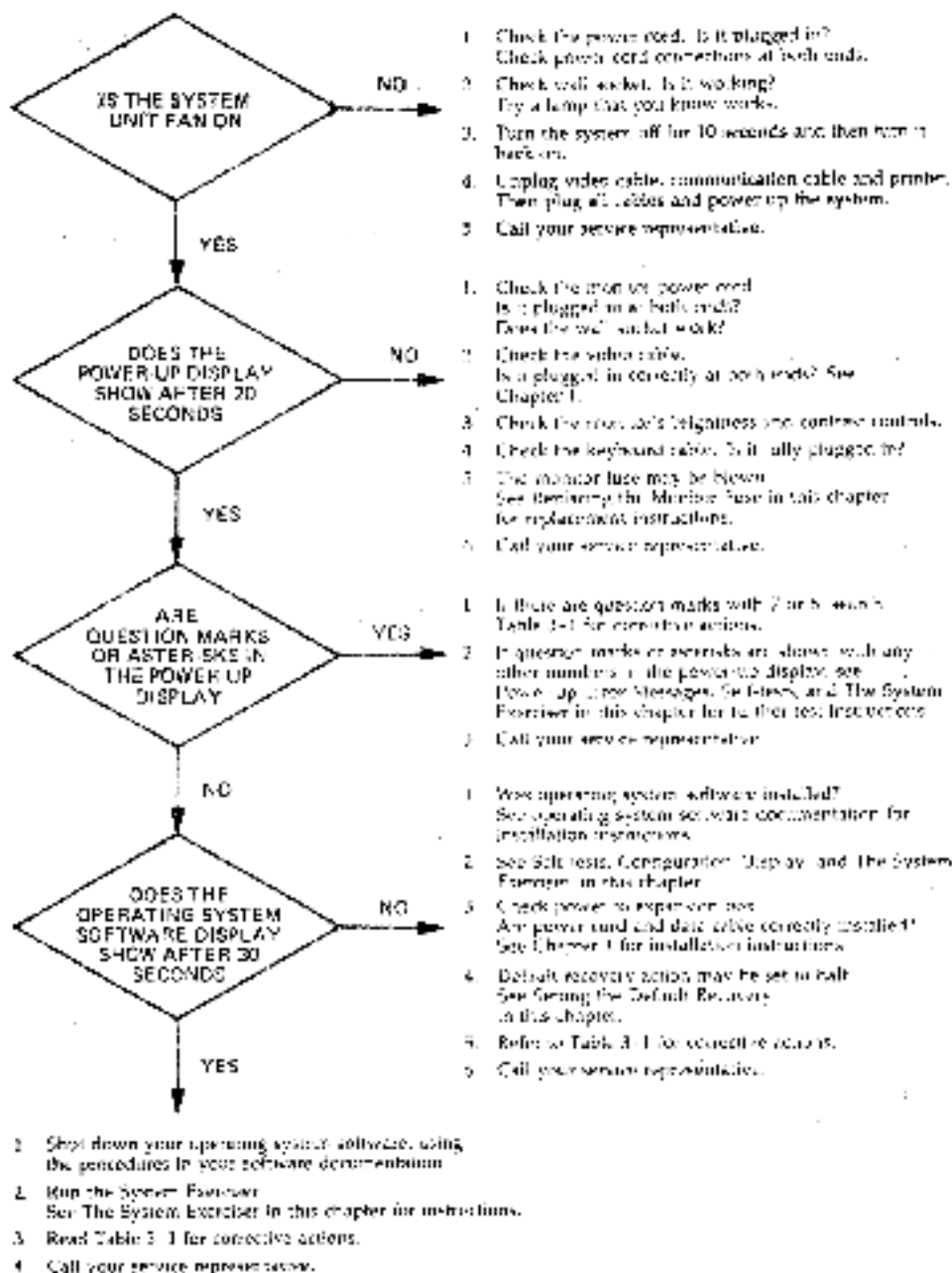
1. Turn off the monitor and all peripherals, such as printer and modem.
2. Turn off any expansion boxes.
3. Turn off the VAXstation 2000 system unit.

At this point all components should be off.

1. Turn on the monitor and expansion boxes.
2. Turn on the VAXstation 2000 system unit.

Observe the results. Read the flowchart (Figure 3-1) and follow the suggested actions on the right side of the chart in order. Make notes of the system conditions when failures occur. Also note the results you obtain from tests and procedures.

Figure 3-1: Troubleshooting Flowchart



Troubleshooting Table

Table 3-1 suggests corrective actions for certain system problems. Before you use the table, review the troubleshooting chart on the previous page.

When you have a problem, follow these steps:

1. Note the symptoms of the problem.
2. Check the Symptom column in Table 3-1 for a match.
3. Check the conditions for that symptom in the Possible Cause column. If the column contains more than one possible cause, check the possible causes and their suggested solutions in the order listed.
4. Follow the advice in the Suggested Solution column.

If you perform all the suggested solutions and the problem still exists, call your service representative.

Information on diagnostic test messages follows this table.

Table 3-1: Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
VR290 and VR260 MONITOR PROBLEMS:		
Screen goes blank after the monitor is left inactive.	The CRT-Saver feature is activated.	Press the CTRL key to reactivate the display.
Power indicator on the front of the monitor is lit and keyboard "wait" light flashes.		
Screen display is distorted, rolling, or flickering.	Video cable is incorrectly installed.	Make sure that the cable is installed properly. See Chapter 1.
Raster (background light field) does not fill the screen.	Video cable is disconnected or faulty.	Connect or replace the video cable.
	System unit is off.	Power up the system unit.

Table 3-1 (Cont.): Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
Poor color purity (color monitor only).	Electromagnetic Interference exists.	Press the degauss switch for a few seconds. After 30 seconds, recheck color purity. Move electromechanical devices away from the monitor or move the monitor.

VR160 MONITOR PROBLEMS

Power indicator does not turn on when you turn on the monitor.	Power cord is not connected to the power source or the monitor.	Turn off the monitor. Reconnect the power cord to the power source and the monitor. Turn on the monitor.
	No power at wall outlet.	Check the outlet by plugging in a lamp. If the lamp does not work, call the responsible facilities person.
	Monitor is faulty.	Turn off the monitor. Contact Field Service.
Screen is blank but power indicator is on.	The system's cathode-ray tube (CRT) screen saver feature is activated.	Press any key to reactivate the display.
	Brightness and contrast controls are turned down.	Turn up brightness and contrast controls.
	Signal cables are not connected to the monitor or the system.	Refer to Chapter 1 for correct procedures to install the cables. Reconnect the signal cables.

Table 3-1 (Cont.): Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
	Monitor or system is faulty.	Turn off the monitor and system. Contact Field Service.
Video is displayed but display does not respond to input devices (keyboard, mouse, tablet). An error message may be displayed.	One of the input devices is disconnected.	Turn off the monitor and system. Connect the input device. Turn on the monitor and system.
	One of the input devices has a faulty or loose connection.	Turn off the monitor and system. Disconnect and reconnect the input devices. Turn on the monitor and system.
	System or one of the input devices is faulty.	Turn off the monitor and system. Contact Field Service.
Raster can be displayed by turning up the brightness control, but no video or cursor can be seen even when the contrast control is at maximum.	Signal cables are disconnected on the monitor or the system.	Refer to Chapter 1 for correct procedures to install the cables. Reconnect the signal cables.
	Monitor or system is faulty.	Turn off the monitor and system. Contact Field Service.
Screen display is distorted, flickering, or rolling.	Green signal cable has loose connection or is not connected to the monitor or the system.	Refer to Chapter 1 for correct procedures to install the cables. Reconnect the green signal cable.

Table 3-1 (Cont.): Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
		Monitor or system is faulty. Turn off the monitor and system. Contact Field Service.
Red or blue color is missing.	Red or blue signal cable has loose connection, or is not connected to the monitor or system.	Refer to Chapter 1 for correct procedures to install the cables. Reconnect the red or blue signal cable.
	System or cable for the missing color is faulty. Verify this problem by swapping the red and blue signal cables on the monitor. If the missing color returns, the system or the cable for the missing color is faulty.	Turn off the monitor and system. Contact Field Service.
	Monitor is faulty. Verify this problem by performing the same procedure described in the previous step. If the missing color does not return, the monitor is faulty.	Turn off the monitor. Contact Field Service.
Screen displays foreign colors (bad purity).	Monitor has been swiveled.	Press degauss switch for 5 seconds.
Caution: Before moving the monitor, turn off the monitor and wait 20 seconds to allow static electricity on the CRT to dissipate.		
	Electromagnetic interference exists. In most cases, if purity problems cannot be corrected by pressing the degauss switch for 5 seconds, then electromagnetic interference exists.	Move any electromechanical device, such as an electric pencil sharpener, away from the monitor or move the monitor.

Table 3-1 (Cont.): Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
	Monitor is faulty.	Turn off the monitor. Contact Field Service.
VR-50 MONITOR PROBLEMS		
Power indicator does not turn on when you turn on the monitor.	Power cord is not connected to the power source or the monitor.	Turn off the monitor. Reconnect the power cord to the power source and the monitor. Turn on the monitor.
	No power at wall outlet.	Check the outlet by plugging in a lamp. If the lamp does not work, call the responsible facilities person.
	Monitor is faulty.	Turn off the monitor. Contact Field Service.
Screen is blank, but power indicator is on.	System's cathode-ray tube (CRT) saver feature is activated.	Press any key to reactivate display.
	Brightness and contrast controls are turned down.	Turn up brightness and contrast controls.
	Video cable assembly is loose or installed incorrectly on the monitor or system.	Refer to Chapter 1 for correct procedures to install the video cable assembly. Reconnect the cable.
	Monitor or system is faulty.	Turn off the monitor. Contact Field Service.

Table 3-1 (Cont.): Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
Video is displayed but screen display does not respond to input devices (keyboard, mouse, tablet). An error message may be displayed.	One of the input devices is disconnected.	Turn off the monitor and system. Reconnect the input device. Turn on the monitor and system.
	One of the input devices has a faulty or loose connection.	Turn off the monitor and system. Disconnect and reconnect the input devices. Turn on the monitor and system.
	System or one of the input devices is faulty.	Turn off the monitor. Contact Field Service.
Raster is present, but no cursor or video appears.	Video cable assembly is disconnected from either the monitor or system.	Refer to Chapter 1 for correct procedures to install the video cable assembly. Reconnect the cable.
	Monitor or system is faulty.	Turn off the monitor and system. Contact Field Service.

Caution: Before moving the monitor, turn off the monitor and wait 20 seconds to allow static electricity on the CRT to dissipate.

Screen display is rotated. (Display appears to be tilted to the left or right.)

Electromagnetic interference exists. To test for electromagnetic interference, slowly swivel the monitor. If the degree of rotation changes significantly, the rotation is caused by electromagnetic interference.

Move any electromechanical device, such as an electric pencil sharpener, away from monitor or move monitor.

Table 3-1 (Cont.): Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
	Monitor is faulty. Slowly swivel the monitor. If the degree of rotation does not change significantly, the monitor is faulty.	Turn off the monitor. Contact Field Service.
Screen display is distorted, flickering, or rolling.	Monitor is faulty.	Turn off the monitor. Contact Field Service.
MOUSE PROBLEMS		
Mouse does not track properly.	The tracking ball is dirty.	Clean the tracking ball. See the Mouse Maintenance section.
Pointing device (mouse or optional tablet) pointer does not appear on the monitor screen, or the monitor does not respond to the pointing device commands.	Cable is installed incorrectly.	Unplug and then re-plug the cable to reset the device. See Chapter 1.
	The VAXstation 2000 is in console mode; therefore, no pointer appears on the screen.	
	The pointer may be off screen under certain conditions governed by workstation software. Check your software documentation.	

Table 3-1 (Cont.): Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
DISK AND DISKETTE PROBLEMS		
Software does not boot from fixed disk drive.	A problem exists with the fixed disk.	See The Fixed Disk Verifier in this chapter to run the fixed disk verifier. See Self-tests, Configuration Display, and The System Exerciser for instructions on these tests.
	Default boot device is set incorrectly.	See Changing the Default Boot Device in this chapter to set the default boot device.
	Recovery action may be set to halt. See Setting Recovery Action.	
	A problem exists with the software (if installed) on the fixed disk.	Refer to your software documentation for help.
Software does not boot from diskette drive. or Diskette read or write error message is displayed.	No diskette is in the diskette drive.	Insert a diskette with bootable software. Use instructions in software documentation.
	Diskette was inserted incorrectly.	Check that the write-protect notch on the diskette is to your left when you insert the diskette and that the label is up.
	Diskette is damaged or does not contain bootable software.	Try another diskette that contains bootable software.

Table 3-1 (Cont.): Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
TAPE DRIVE PROBLEMS		
TK50 tape drive red light flashes rapidly.	The drive mechanism is faulty.	Press and release the load/unload button four times to clear the fault. If the condition persists, do not attempt to remove the tape cartridge or use the tape drive. Call your service representative.
TK50 passes power-up test but does not operate	No cartridge in drive or the cartridge is not loaded.	Insert the cartridge and press the load/unload button.
Cartridge release handle does not lift.	Power-up display is still in progress.	Wait for red light to go out and try again. If the problem persists, do not use the drive. Call for service.
Cartridge release handle does not lock.	Cartridge is not inserted properly.	Reinsert the cartridge. If the problem persists, call for service.
Tape does not load.	The load/unload button is in unload position.	Put load/unload button in load position. Wait for light to go out before removing tape.

Power-up Error Messages

Note: If your monitor does not display any information on the screen after the power-up test sequence (approximately 1 minute), you may have a monitor, video, or system board failure. Check the monitor, then check the LEDs on your keyboard for secondary power-up error messages. If any of the LEDs on the keyboard is lit, call your service representative.

The VAXstation 2000 displays important information during its power-up test sequence, as described in Chapter 1. If the sequence displayed during power

up contains question marks or asterisks, failures may exist in the system. Use Table 3-2 to identify the faulty device.

An asterisk indicates that a ROM has been found for the option, but no test code exists.

A single question mark indicates a "soft" error. A soft error does not prevent normal operation of the system and serves to report the status of the system. An example of a soft error is:

```
? E 0040 0000.0005
```

A double question mark indicates a "hard" error, which is one that indicates a serious problem that may affect normal operation and use of some component of the VAXstation 2000. An example is:

```
?? 1 0000 0001.7004
```

Some common power-up error messages are:

1. Clock not set

```
? E 0040 0000.0005
```

This message indicates that the system clock has not been set. Setting the clock is part of the operating system software installation; see your operating system software documentation for instructions.

2. Low battery

```
? D 0050 0000.0005
```

This message indicates that the system battery's charge is low or completely discharged. Run the system for about 17 hours to fully recharge the battery.

3. Monochrome monitor with 4- or 8-plane graphics coprocessor

```
? 4 0000 0020.0213
```

This message indicates that a monochrome monitor is connected to a 4- or 8-plane graphics coprocessor.

If you see single question marks on the power-up display, especially next to a 7 or 6 (disk or tape drive controllers), but operation of the VAXstation 2000 seems normal, continue to use the system. If you continue to see errors of this type during the power-up display, use the information in the rest of this chapter to solve the problems. See *The System Exerciser* and

The Fixed Disk Verifier sections. If the system continues to display error information or fails to operate normally, call your service representative.

A double question mark indicates a "hard" error. This error indicates a serious problem that may affect normal operation and use some component of the VAXstation 2000. An example is:

?? 1 0000 0001.7004

4. No ThinWire Ethernet cable

?? 1 0000 0000.7004

This message indicates that the Ethernet option module is present in the system, but no cable has been installed on the connector on the rear of the system unit. If you want to install this cable, see Chapter 1 for instructions.

Table 3-2: Power-up and Self-test Display Identifiers

Test Identifier	Device
F	Base Video
E	System Clock
D	Nonvolatile Random Access Memory (RAM)
C	Serial Line Controller
B	Memory
A	Memory-management Unit
9	Floating-point Unit
8	Interval Timer
7	Disk Controller
6	Tape Controller
5	Interrupt Controller and Ethernet ID ROM
4	Optional 4-plane Graphics Coprocessor
3	Reserved for later use
2	Reserved for later use
1	Ethernet Network Interconnect Module

Some errors indicated by single question marks may not indicate problems that need immediate servicing. If you see single question marks on the

power-up display, especially next to a 7 or 6 (disk and tape drive controllers), but operation of the VAXstation 2000 seems normal, continue to use the system. If you continue to see errors of this type during the power-up display, use the information in the rest of this chapter to solve the problems. See The System Exerciser and The Fixed Disk Verifier sections. If the system continues to display error information or fails to operate normally, call your service representative.

Self-tests

The self-test diagnostic programs reside permanently in your VAXstation 2000's ROM, as the other diagnostics do. You can run self-tests from the keyboard. Type **TEST 50** or **T 50** after each self-test to display the status on the device tested.

To test a device in your VAXstation 2000, follow these steps:

1. Use Table 3-2 to find the number or letter that represents the device(s) you want to test.

Note: Read your software documentation for shutdown procedures before halting the system.

2. Put the VAXstation 2000 in console mode by pressing the halt button on the rear of the system. (See Chapter 1 for information on the halt button.)
3. Type **TEST** or just **T** and a space followed by the appropriate number or letter, then press RETURN:

```
>>> TEST 7
```

If you want to test a consecutive series of devices, type **TEST** followed by the first and last numbers of the series, then press RETURN:

```
>>> TEST F 1
```

The system displays the number of each device as it is tested, followed by a series of periods.

If the self-test is successful, no question mark or error message is displayed, and the console prompt appears:

```
7...  
>>>
```

If a device fails the self-test, a failure message is displayed before the console prompt is returned.

```
77...  
84 FAIL  
>>>
```

If a self-test results in a failure, run the configuration display.

Configuration Display

Note: Read your software documentation for shutdown procedures before halting the system.

1. Put the VAXstation 2000 in console mode by pressing the halt button on the rear of the system. (See Chapter 1 for information on the halt button.)
2. Type **TEST 50** at the console prompt (>>>), then press RETURN. This procedure displays the system configuration and status information, which will be similar to the one shown in Figure 3-2. The mnemonics for each device in the configuration are listed in Table 3-3. Error information in this display is valuable to your service representative. Record this information before calling for service.

Figure 3-2: Sample System Configuration

```
>>> TEST 50
KA410-B V2.2
ID 08-00-2B-02-CF-A4

?? MONO      0001.F002
? CLK        0000.0005
NVR          0000.0001
DZ           0000.0001
00000001 00000001 00000001 00000001 00000001 000012A0
MEN         000E.0001 <--- 12MB memory option installed.
00E00000 <----- E represents total memory of 14MB.
MM          0000.0001
FP          0000.0001
IT          0000.0001
HDC         1710.0001
| |         | | |
+---+       | | +----- Controller
|           | | +----- DUA0
|           | | +----- DUA1
|           | +----- DUA2
+-----+   +----- Disk drive controller
```

See Table 3-4 for more information.

```
000146B8 00000000 00000320
| | | | |
+---+ +---+ +---+
| | | | |
| | | | | +----- Indicates type of media in DUA2
| | | | | +----- Indicates type of drive in DUA1
+-----+ +----- Indicates type of drive in DUA0
```

See Table 3-5 for more information on determining the device installed in your system.

```
TPC         0202.0001
FFFFF03 010C0001 FFFFFFF05 FFFFFFF05 FFFFFFF05 FFFFFFF05 ...
SYS         0000.0001
4PLN*       0000.0001 V1.4
NI          0000.0001 V1.3

>>>
```

* For 4PLX, 8PLX, DBT, or HST options.

Figure 3-2 (Cont.): Sample System Configuration

>>>

* For APLN, BPLN, DHT, or RST options.

Table 3-3: Definition of Mnemonics

Mnemonic	Device
CLK	System Clock
4PLN	4-plane Graphics Coprocessor
8PLN	8-plane Graphics Coprocessor
DZ	Serial Line Controller
FP	Floating Point
HDC	Disk Controller
IT	Interval Timer
MEM	Memory
MM	Memory Management
MONO	Monochrome Video Circuits on System Module
NI	Network Interconnect Option Module
NVR	Nonvolatile RAM
SYS	Interrupt Controller and Ethernet ID ROM
TPC	Tape Controller

The "HDC" mnemonic represents the disk controller. The first 3 numbers to the right of "HDC" are explained in Table 3-4.

Table 3-4: Installed Devices

If Numerical Position is:	And Number is:	Then
1st	1	Drive is installed in DUA2 and diskette is formatted.
1st	7	Drive is not installed in DUA2 or formatted diskette is not loaded.
1st	any other number	Call service representative.
2nd	1	Drive is installed in DUA1.
2nd	7	Drive is not installed in DUA1 or powered on.
2nd	5	Not formatted.
2nd	any other number	Call service representative.
3rd	1	Drive is installed in DUA0.
3rd	7	Drive is not installed in DUA0.
3rd	5	Not formatted.
3rd	any other number	Call service representative.

The second line of the HDC line in the screen display tells you what type of device is installed. Look at Table 3-5 to determine the type of device installed in your system.

Table 3-5: Device Numbers

Number	Device
146B8	RD32
2200D	RD53
4C437	RD54
960	RX33 media in disk drive
320	RX50 media in disk drive

The second line of the "DZ" line in the screen display tells you about the keyboard and the pointing device. If the last group of numbers is 000012A0, then the pointing device is present. If the next to the last group of numbers is 00000001, then the keyboard is present.

then the pointing device is present. If the next to the last group of numbers is 00000001, then the keyboard is present.

Run the system exerciser to obtain additional error information.

The System Exerciser

The system exerciser tests the interaction between devices within the system. Use the system exerciser when the VAXstation 2000 has intermittent problems, or when you see errors associated with 7 or 6 in the power-up displays or self-tests. The system exerciser takes up to 11 minutes to complete.

Note: Read your software documentation for shutdown procedures before halting the system.

1. Put the VAXstation 2000 in console mode by pressing the halt button on the rear of the system. (See Chapter 1 for information on the halt button.)
2. Type **TEST 0** at the console prompt (**>>>**), then press RETURN.

Different graphics tests display on the screen during the system exerciser. A sample system exerciser display is shown in Figure 3-3 with elements of the display identified. If you get any errors, call your service representative for assistance.

Figure 3-3: System Exerciser Sample Display

```
KA410-B V2.2      01      CU

  F 0030 MONO 0000.0001      1 0 00:00:35.47
  C 0060 DZ   0200.0001      1 0 00:01:12.90
  E 0010 MEM  0000.0001      0 0 00:02:02.06
  7 0090 RDC  1F00.0000      1 0 00:02:23.71
  ?                                0701.21E1 <- 1 0 00:02:25.71
- 6 00A0 TPC  8000.0001      1 0 00:02:56.80
| 4 00D0 APLN 0000.0001      1 0 00:03:55.76
| 1 00C0 K1   0000.0001      0 0 00:04:01.82
|
|                                     error information for individual drives
|                                     connected to disk drive controller
|
|                                     error information for each device
|
|                                     mnemonic for the device
|
| device identifier
|
error indicators
```

Single and double question marks indicate errors. Note the mnemonic associated with the question mark. Table 3-6 gives the devices that correspond to each mnemonic. Record this information for your service representative.

Table 3-6: Definition of Device Mnemonics

Mnemonics	Device
MONO	Base Video
CLK	System Clock
4PLN	4-plane Graphics Coprocessor
8PLN	8-plane Graphics Coprocessor
NVR	Nonvolatile RAM
DZ	Serial Line Controller
MEM	Memory
HDC	Disk Controller
MM	Memory Management
FP	Floating Point
IT	Interval Timer
TPC	Tape Controller
NI	Ethernet Network Interconnect Module

Type **BOOT** (or **BOOT** followed by the name of the device that contains operating system software) at the console prompt and press **RETURN** to return to normal operation.

The Fixed Disk Verifier

The Fixed Disk Verifier can determine:

1. What kind of drives are installed in the system.
2. If a fixed disk has been formatted.
3. If any faults occur in the fixed disks.

If you see single question marks for the disk drive controller (mnemonic **HDC**) during power up or while running the system exerciser, run the fixed disk verifier. This test locates and reports any faults in the fixed disks in the system. Give this information to your service representative.

You can also use the verifier to determine what kind of drives are contained in your system.

The verifier takes 5 minutes for an RD32 fixed disk drive, 8 minutes for an RD53, and 20 minutes for an RD54.

Note: The fixed disk verifier does not destroy software or data on the disk.

Note: Read your software documentation for shutdown procedures before halting the system.

1. Put the VAXstation 2000 in console mode by pressing the halt button on the rear of the system unit.
2. Type **TEST 71** at the console prompt (**>>>**), then press **RETURN**.

The following text is displayed:

```
VSsav_QUE_unitno (0-1)?
```

3. Type **0** to verify a fixed disk drive in the system unit or **1** to verify a fixed disk in the expansion box, then press **RETURN**.

The following text is displayed:

```
VSsav_STS_Siz ..... RDxx [xx represents 32, 53, or 64 depending  
on the type of fixed disk drive.]
```

```
VSsav_QUE_RDsure (DUAX 1/0) ? [x represents the number  
chosen, 0 or 1.]
```

If the disk has not been formatted or a problem occurs with the disk, the following text appears:

```
VSsav_STS_Siz ..... ??
```

```
VSsav_RES_Err #2
```

```
B4 FAIL
```

```
>>>
```

If you see this text and you want to format your disk, format it according to the instructions in Chapter 1. If the disk is faulty, the formatter program will not be able to complete the formatting procedure. If this happens, call your service representative.

4. Type **1** and press **RETURN** if you want to continue. To stop the verifier, type anything other than **1**. The verifier stops, an error message is displayed, and the console prompt (**>>>**) is returned. You may start over with the **TEST 71** command or any other command.

The following sample text is displayed after you type 1:

```
VSnsv_STS_RDing .....OK
VSnsv_STS_OBBcnt = 14
VSnsv_STS_NBBcnt = 0
VSnsv_RES_Succ
>>>
```

This text verifies that the disk is in good operating condition. However, if you see the following text, the fixed disk is faulty and may need repair or replacement.

```
VSnsv_STS_NBBcnt = X [X indicates any number higher than 50]
```

Call your service representative.

5. Type **BOOT** (or **BOOT** followed by the name of the device that contains operating system software) at the console prompt and press RETURN to return to normal operation.

Setting the Default Recovery

During manufacture, your system is set to automatically start up the operating system software every time you power up or in the event of an operating system software crash. To change this recovery action setting, follow these steps:

Note: Check your software documentation for shutdown procedures before halting your system.

1. Put the VAXstation 2000 in console mode by pressing the halt button on the rear of the system.
2. At the console prompt (>>>), type **TEST 53**, then press RETURN.

If the system is already set to reboot automatically, the following is displayed:

```
2 ? >>>
```

3. Press RETURN at the console prompt if you want to retain this setting. If 3 is displayed instead of 2, your system is set to halt automatically after every power up. If you want to change from automatic halt to automatic reboot, type 2 at the console prompt and press RETURN. If

you want to automatically **RESTART** should the system go down, type **1** at the console and press **RETURN**.

4. If you want your system to halt after every power up, type **3** at the console prompt and press **RETURN**.

In this case, your system will display the console prompt after every power-up sequence, and you must type **BOOT** (or **BOOT** followed by the device name of the device containing operating system software) every time you power up.

Changing the Default Boot Device

The default boot device should be set during installation of the VAXstation 2000, when the installer determines where the operating system software resides. The VAXstation 2000 then *boots* from that device at power up, provided the default recovery action is set to **BOOT**. (See Setting the Default Recovery Action for more information.) The operating system software can reside in one of the following places:

- A fixed disk in the system unit
- A fixed disk in the expansion box
- A remote system that you access through the Ethernet

Table 3-7 shows the name of each default boot device.

Table 3-7: Default Boot Device Names

Device and Location	Device Name
Fixed disk in system unit	DUA0
Fixed disk in expansion box	DUA1
Remote system accessed by Ethernet	ESA0
Diskette drive in system unit	DUA2
Tape drive in expansion box	MUA0

Devices DUA2 and MUA0, although valid default boot devices, do not have enough storage capacity to contain most operating system software.

To change the default boot device, follow these steps.

Note: Check your software documentation for shutdown procedures before halting your system.

1. Put the VAXstation 2000 in console mode by pressing the halt button on the rear of the system.
2. At the console prompt (>>>), type **TEST 51**, then press RETURN.
3. If no boot device has been previously selected, the following is displayed:

..... ? >>>

Type the default boot device name you want, then press RETURN.

If a boot device has previously been chosen, that device is displayed as follows (DUA0 is a sample):

DUA0 ? >>>

To change the default boot device, enter the name of the device you want, followed by RETURN. If you do not want to change the default device, press RETURN. To change the default back to no device, type a period (.) at the console prompt. At subsequent power ups, the VAXstation 2000 will attempt to boot each device in the system in turn.

4. Type **BOOT** (or **BOOT** followed by the name of the device that contains operating system software) at the console prompt and press RETURN to return to normal operation.

Note: If you type in a boot command, the default will not apply.

Setting the Keyboard Language

Note: Check your software documentation for shutdown procedures before halting your system.

1. Put the VAXstation 2000 in console mode by pressing the halt button on the rear of the system.
2. To reset the keyboard language, type **TEST 54** at the console prompt. A list of languages is displayed. Choose the number of the language you want and press RETURN.
3. Type **BOOT** (or **BOOT** followed by the name of the device that contains operating system software) at the console prompt and press RETURN to return to normal operation.

Monitor Screen Pattern Tests

Screen pattern tests are useful if you suspect a malfunction in your monitor. Record what you see to report to your service representative.

Note: Check your software documentation for shutdown procedures before halting your system.

Put the VAXstation 2000 in console mode by pressing the halt button on the rear of the system. Then run any of the tests listed. When you have finished, type **BOOT** (or **BOOT** followed by the name of the device that contains operating system software) at the console prompt and press **RETURN** to return to normal operation.

Color Monitor

1. Screen of Es Pattern

Type **TEST 81** and press **RETURN**.

The monitor displays a full screen of Es. Press **RETURN** to stop the display and return the console prompt.

2. White Screen

Type **TEST 82** and press **RETURN**.

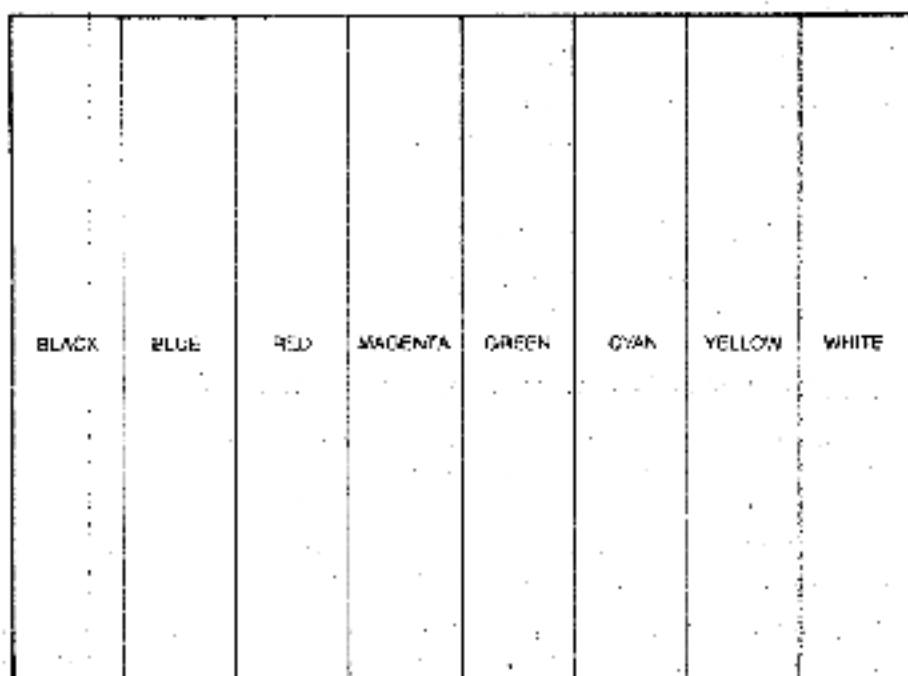
The monitor displays a white screen. Press **RETURN** to stop the display and return the console prompt.

3. Eight color bars

Type **TEST 87** and press **RETURN**.

The monitor displays the following eight color bars (Figure 3-4).

Figure 3-4: Color Bars



AT&T 000001

Gray-scale Patterns

If you are using gray-scale on your color or monochrome monitor and suspect a malfunction in your monitor, use the following test for gray-scale patterns:

1. Eight gray-scale bars

Type **TEST 88** and press **RETURN**.

The monitor displays eight gray-scale bars from black to white.

Monochrome Monitor

1. Screen of Es Pattern

Type **TEST 61** and press **RETURN**.

The monitor displays a full screen of Es. Press **RETURN** to stop the display and return the console prompt.

2. White Screen

Type **TEST 62** and press **RETURN**.

The monitor displays a white screen. Press **RETURN** to stop the display and return the console prompt.

Restarting the System After Running Tests

While you are running any of the tests or procedures in this chapter, you are in console mode. To resume normal operation of the VAXstation 2000, you must reenter *program mode*. The two ways to do this are:

1. Type **BOOT** at the console prompt and press **RETURN**. The system then searches each device in turn for operating system software.
2. Type **BOOT** followed by a space and the name of the device that contains operating system software and then press **RETURN**, as shown in this example:

```
>>> BOOT DQAO
```

This procedure lets the system boot the operating system software immediately, without searching.

See your software documentation for more information.

Summary of TEST Commands

A list of all **TEST** commands and the tests or utility programs they execute is shown in Table 3-8.

Table 3-8: Summary of TEST Commands

Command	Test or Utility Program
TEST 0	System exerciser
TEST F-1	Self-tests of each device in the system. (See Table 3-2.)
TEST 50	Configuration
TEST 51	Sets default boot device
TEST 52	Sets default boot flags (operating system dependent)
TEST 53	Sets default recovery action
TEST 54	Sets keyboard language
TEST 61	Screen of Es (Monochrome Monitor)
TEST 62	White screen (Monochrome Monitor)
TEST 70	Diskette and fixed disk formatter
TEST 71	Fixed disk verifier
TEST 80	Circle cross-hatch*
TEST 81	Screen of Es (Color Monitor)
TEST 82	White screen (Color Monitor)
TEST 83	4-bar color bars*
TEST 84	Red screen*
TEST 85	Green screen*
TEST 86	Blue screen*
TEST 87	8 color bars (Color Monitor)
TEST 88	8 gray-scale bars (Color or Monochrome Monitor)

* 25 pin loopback connector required.

Maintenance

Cleaning the Screen of the Monitor

Note: Before cleaning the screen, turn your monitor off and wait 20 seconds to let static electricity dissipate.

Clean the screen with a good quality, nonabrasive and nonflammable glass cleaner.

To clean the color video monitor cover, use a soft cloth dampened with a mild solution of soap and water.

Replacing Monitor Fuses

Use the following procedure after reading the troubleshooting flowchart at the beginning of this chapter. You can replace fuses for the VR290 color monitor, the VR260 monochrome monitor, and the VR150 monochrome monitor.

VR290 Color Monitor

The VR290 color monitor has an automatic voltage-switching mechanism. Therefore, you do not need to change the voltage switch setting.

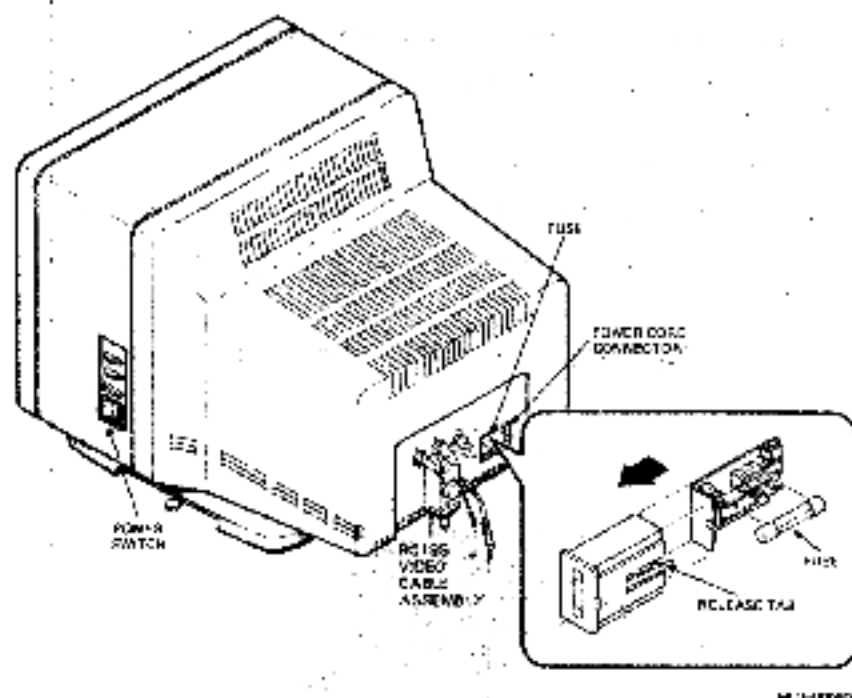
Your monitor contains one of the following fuses:

- 3AG—a 2-amp, 250-volt slow-blow fuse. (DIGITAL part no. 12-14676-04).
- IEC—a 2-amp, 250-volt slow-blow fuse. (DIGITAL part no. 12-19283-03).

Replace the fuse (Figure 3-5) as follows:

1. Turn off the power and wait 30 seconds to allow voltage to dissipate.
Warning: Wait 30 seconds to eliminate chance of shock.
2. Unplug the power cord from the wall outlet and then from the back of the monitor.
3. Carefully pry out the fuse carrier with the screwdriver.
4. Carefully pry open the release tab, remove the inner fuse holder, and replace the fuse.

Figure 3-5: Replacing Fuse, VR290 Color Monitor



5. Return the fuse carrier to its container in the back of the monitor.
6. Replug the power cord into the monitor and then into the wall outlet.
7. Turn on the power.

VR260 Monochrome Monitor

Check to see whether the voltage switch is set properly. See Chapter 1.

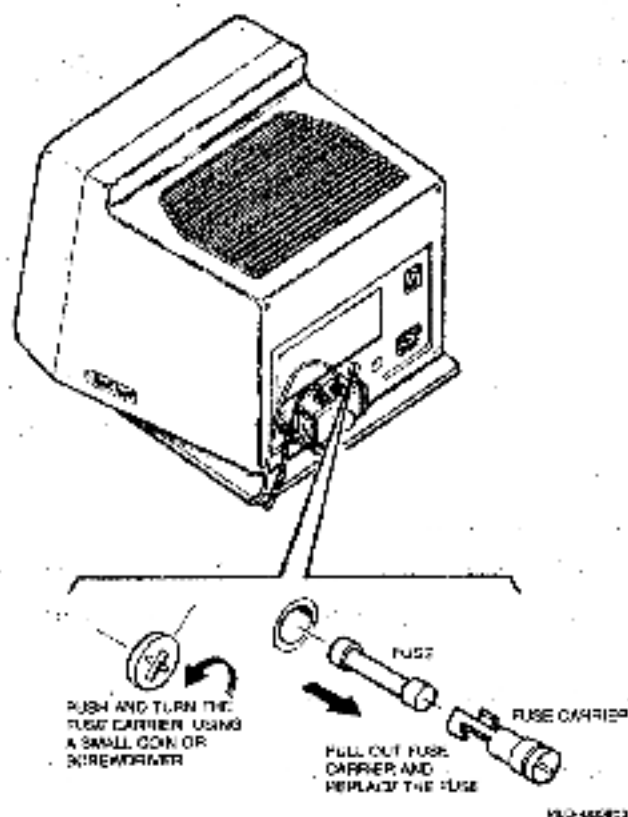
Caution: An incorrect setting of the voltage select switch will damage the monitor.

- If your monitor requires 100–120 volts, use a 1-amp, 250-volt slow-blow fuse.
- If your monitor requires 200–250 volts, use a .5-amp, 250-volt slow-blow fuse.

Replace the fuse (figure 3-6) as follows:

1. Turn off the power and wait 30 seconds to allow the voltage to dissipate.
Warning: Wait 30 seconds to eliminate chance of shock.
2. Unplug the power cord from the wall outlet and then from the back of the monitor.
3. Remove the video cable assembly.
4. Push and turn the fuse carrier, using a small coin or screwdriver.
5. Carefully pull out the fuse carrier, release the inner fuse holder, and replace the fuse.

Figure 3-6: Replacing Fuse, VR260 Monochrome Monitor



6. Return the fuse carrier to its cavity in the back of the monitor.
7. Replace the video cable assembly.
8. Replug the power cord into the monitor and then into the wall outlet.
9. Turn on the power.

VR150 Monochrome Monitor

The VR150 color monitor has an automatic voltage-switching mechanism. Therefore, you do not need to change the voltage switch setting.

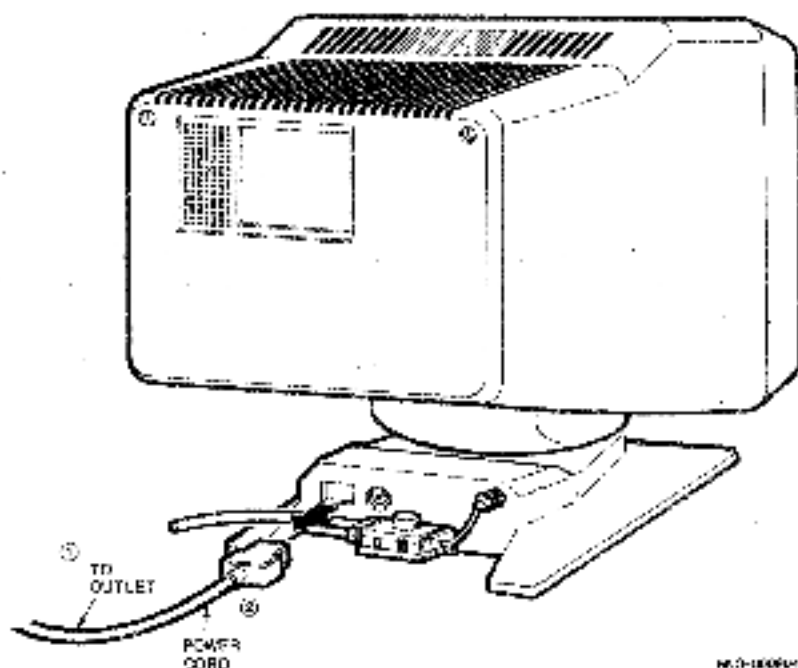
Note: Before replacing the fuse, turn your monitor off and wait 20 seconds. Disconnect the power cord first from the wall outlet, then from the monitor.

Your monitor uses a 4-amp, 250-volt slow-blow fuse (T4-amp, 250-volt slow-blow fuse for the International version).

To replace the fuse:

1. Turn your monitor off and wait 20 seconds; then unplug the power cord (Figure 3-7).

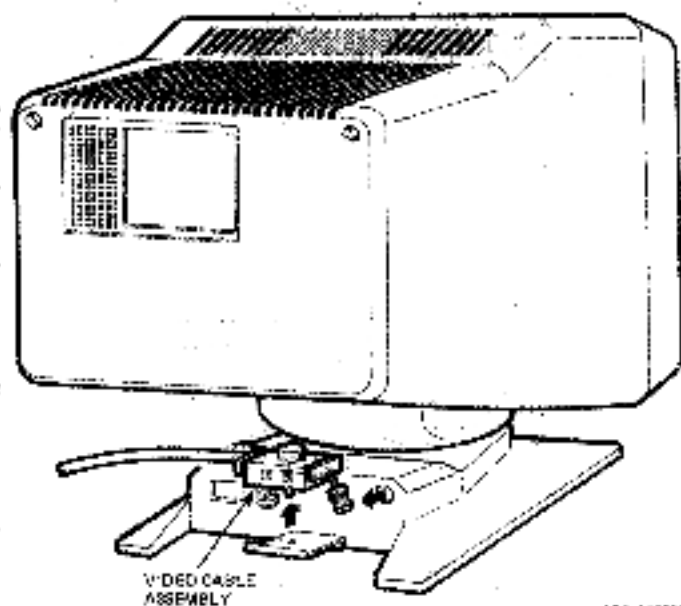
Figure 3-7: Removing Power Cord, VR150 Monochrome Monitor



- 2 Remove the video cable assembly, including the video cable, from the cable mounting plate (Figure 3-8).

Note: Failure to remove the video cable causes strain on the video cable assembly.

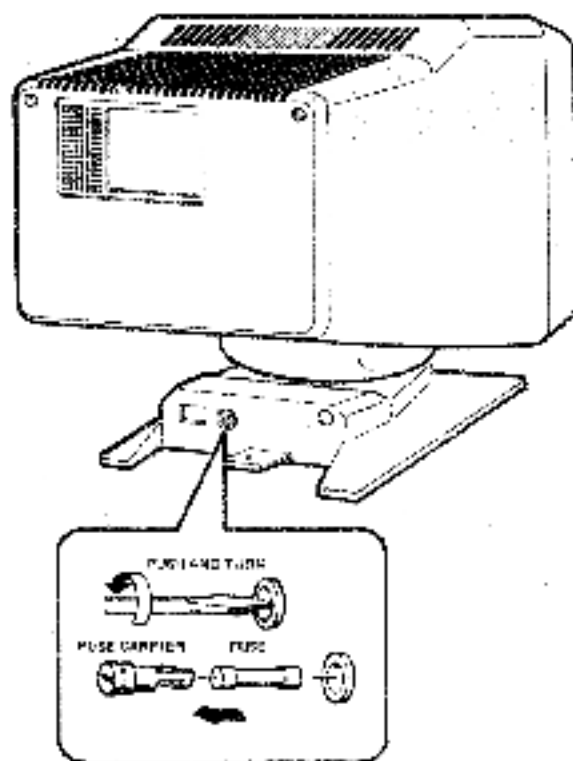
Figure 3-8: Removing Video Cable Assembly, VR150 Monochrome Monitor



5817-110-01

3. Push and turn the fuse carrier, using a screwdriver (Figure 3-9).
4. Pull out the fuse carrier and replace the fuse.
5. Replace the video cable assembly. (Refer to Chapter 1.)

Figure 3-9: Replacing Fuse, VR150 Monochrome Monitor



447 00006

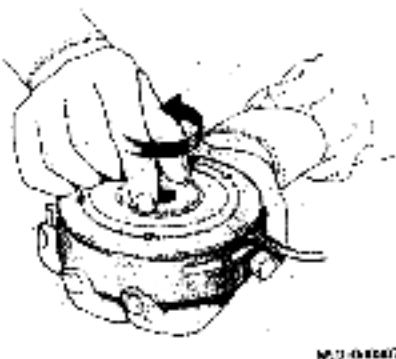
Mouse Maintenance

The rubber-coated ball under the mouse can be removed for cleaning or replacement. Clean the ball when the mouse fails to move the cursor smoothly on the screen. In an average office environment, cleaning the ball every 6 months is sufficient.

The following steps detail how to remove and clean the mouse ball:

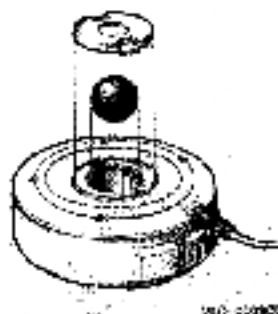
1. Turn the mouse upside down. Remove the ball housing cover plate by placing your fingers in the grooves on the plate and turning the plate counterclockwise (Figure 3-10).

Figure 3-10: Turning the Cover Plate



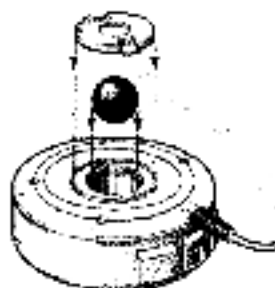
2. Lift off the cover plate and remove the ball (Figure 3-11).

Figure 3-11: Removing the Ball



3. To clean the ball, use lukewarm water and, if necessary, a mild soap. However, do not use organic solvents, such as toluene, which will damage the rubber coating.
4. Dry the ball with a soft, lint-free cloth.
5. Replace the ball and the cover plate (Figure 3-12).

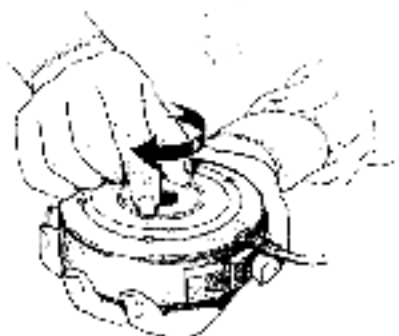
Figure 3-12: Replacing the Ball



ALD-300509

6. Lock the cover plate into position by placing your fingers in the grooves on the cover plate and turning it clockwise (Figure 3-13).

Figure 3-13: Replacing Cover Plate



ALD-300510

Service Information

If you have followed the corrective actions listed in this chapter and you continue to have problems with your VAXstation 2000, call your service representative.

Your sales representative will give you the name and telephone number of your service representative.

Before you call:

1. Make notes based on the troubleshooting chart at the beginning of Chapter 2. This information helps your service representative know the state of your system when the problem occurred.
2. Write down the serial and model numbers of your system. They are located on the back of the system unit.
3. Be prepared to read information from the screen and to type commands at the keyboard while you talk to your service representative on the telephone.

1. The first part of the document is a list of the names of the persons who have been appointed to the various positions of the Board of Directors of the Corporation.

2. The second part of the document is a list of the names of the persons who have been appointed to the various positions of the Board of Directors of the Corporation.

3. The third part of the document is a list of the names of the persons who have been appointed to the various positions of the Board of Directors of the Corporation.

4. The fourth part of the document is a list of the names of the persons who have been appointed to the various positions of the Board of Directors of the Corporation.

5. The fifth part of the document is a list of the names of the persons who have been appointed to the various positions of the Board of Directors of the Corporation.

1

2

3

Options for the VAXstation 2000

The options supported by the VAXstation 2000 fall into the following categories:

- **Hard-copy Output Devices**—Printers and plotters
- **Communication Devices**—Modems and standard Ethernet connector
- **Pointing Device**—Tablet
- **Memory**—Memory modules
- **Video**—Color monitor and 4-plane graphics coprocessor
- **Mass Storage Devices**—Expansion box, expansion adapter, fixed disk drive, diskette drive, and tape drive

This chapter describes each option. To install the printers, modems, tablet, and expansion box (containing the fixed disk drive or tape drive), see Chapter 1. To install standard Ethernet, see the *Workstations and MicroVAX 2000 Network Guide*. Contact your service representative if you do not wish to install an option yourself. You must contact your service representative to install the expansion adapter, memory modules, diskette drive, or fixed disk drive into the system unit.

Documentation for each option is listed in Appendix B.

To order an option or cables after initial installation of your system, contact your sales representative.

Hard-copy Output Devices

The VAXstation 2000 can be used with the following hard-copy output devices: the LN03, LN03 PLUS, LN03R SCRIPTPRINTER, and LPS40 laser printers, the LA210 and LA75 dot matrix printers, and the LCG01 color printer. For installation information, see Chapter 1.

The LN03

The LN03 laser printer is a desktop, nonimpact printer that produces letter-quality text at 8 pages/minute. For systems running VMS, the printer can also display graphics.

The LN03 offers 46 fonts, including Courier, Elite, and the VT100 Line-Drawing Set (the DIGITAL standard set). ASCII multinational technical character sets and 12 national language character sets can also be used.

The printer comes with three character sets. The LN03 can print up to 24 fonts on a page. To expand memory or add additional fonts, you can purchase more programmable RAM or precoded ROM cartridges from DIGITAL.

The LN03 uses only cut-sheet paper. A paper cassette holds 250 sheets of paper. The printer automatically collates output for you in its face-down output tray. The LN03 can also handle preprinted single-part forms, transparencies, and labels. The LN03 can print in either landscape (horizontal) or portrait (vertical) mode.

The LN03 weighs 28 kg (66 lb).

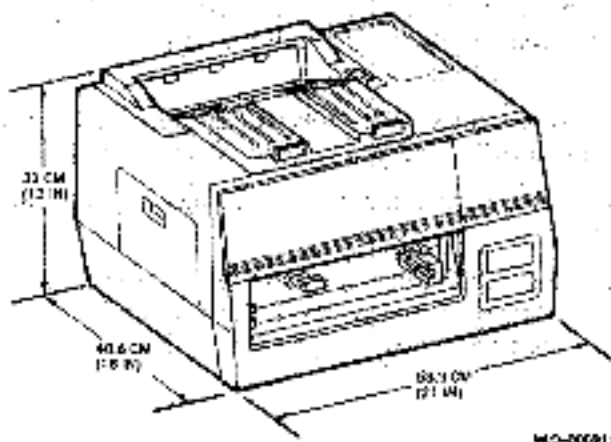
To order an LN03 printer after the initial system installation, contact your sales representative. You can install the LN03 printer yourself. After assembling the printer, see Chapter 1.

The LN03 PLUS

The LN03 PLUS is the upgrade configuration of the LN03 laser printer. The LN03 PLUS system consists of a base LN03 laser printer and an LN03S *bitmap* option module. The LN03 PLUS requires the firmware microcode V4.4 to be installed in the base LN03 printer.

The LN03 PLUS enhances the ability of the LN03 printer to print documents composed of text and graphics. The LN03 PLUS lets you process ANSI and Tektronix data files with any ratio of text to graphics and with no limits on image complexity.

Figure 4-1: The LN03



The LN03S bitmap option module consists of a *printed circuit board* that is inserted into the available option slot of the LN03 printer. This option module's key feature is an on-board memory capacity of one *Mbyte* of dynamic RAM used for bitmap storage. The LN03S option module also contains up to 128K bytes of ROM for program and font storage.

The printer and host system communicate through the standard RS232-C serial interface.

All setup features in the LN03 PLUS are the same as in the base LN03 and are controlled through the default setting of configuration switches or under program control.

To order an LN03 PLUS printer or an LN03S option module for installation into an existing LN03 printer, contact your sales representative. You can install the LN03 PLUS printer yourself. After assembling the printer, see Chapter 1.

The LN03R SCRIPTPRINTER

The LN03R SCRIPTPRINTER is a nonimpact page printer that uses laser recording technology to produce high-quality prints. Using the PostScript² language, the SCRIPTPRINTER can combine and print complex pages, including text, graphics, and sampled images.

The SCRIPTPRINTER provides 750 dots/centimeter (300 dots/inch), both vertically and horizontally, and prints eight pages per minute.

The printer and host system communicate through the standard EIA-RS232-D serial interface.

To order an LN03R SCRIPTPRINTER after the initial system installation, contact your sales representative. You can install the LN03R SCRIPTPRINTER yourself. After assembling the printer, see Chapter 3.

The LA210

The LA210 is a dot matrix desktop printer that can produce high-speed drafts (240 characters/second) or near letter-quality correspondence (40 characters/second). With the addition of an optional font cartridge, the LA210 can print memo-quality correspondence (80 characters/second). The LA210 also prints bitmap graphics.

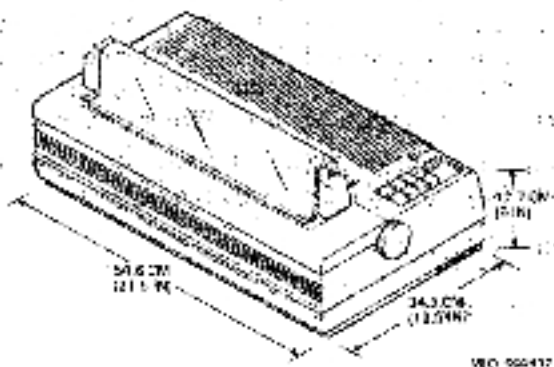
The printer can print in USASCII, 10 national languages in Courier 10, and the VT100 line-drawing set (the DIGITAL standard set). Other features include three optional typefaces: Gothic, Orator, and Italic. Over 300 optional character sets, including symbols and technical characters, can be added by plug-in font cartridges. You can select up to eight character widths.

The LA210 prints on single-sheet and fanfold paper and handles forms with up to four parts. The printer's carriage accommodates paper ranging in width from 8.9 cm (3.5 in) to 37.8 cm (14.9 in).

The printer weighs 11.3 kg (25 lb).

² PostScript is a trademark of Adobe Systems, Inc.

Figure 4-2: The LA210



To order an LA210 printer after the initial system installation, contact your sales representative. You can install the LA210 printer yourself. After assembling the printer, see Chapter 1.

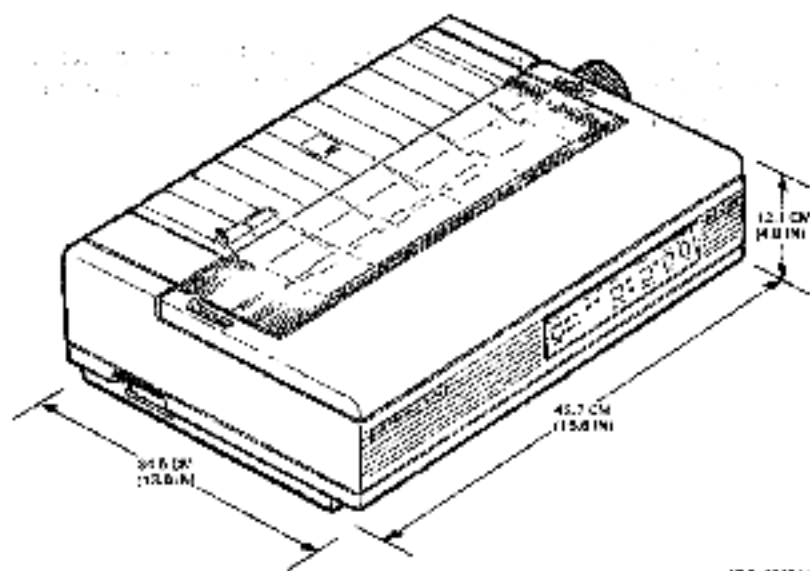
The LA75

The LA75 is a desktop dot matrix printer that can produce sixel-protocol bitmap graphics. The LA75 prints in draft speed (250 characters/second), memo speed (125 characters/second), and letter-quality speed (32 characters/second). The printer offers optional font cartridges and international character sets. You can use office stationery or fanfold paper.

The LA75 is compatible with DIGITAL's LA210 printer as well as IBM's PRO printer. The LA75 uses the DEC423 serial interface.

The LA75 weighs 10 kg (22 lb).

Figure 4-3: The LA75



480-000014

To order an LA75 printer after the initial system installation, contact your sales representative. You can install the LA75 printer yourself. After assembling the printer, see Chapter 1.

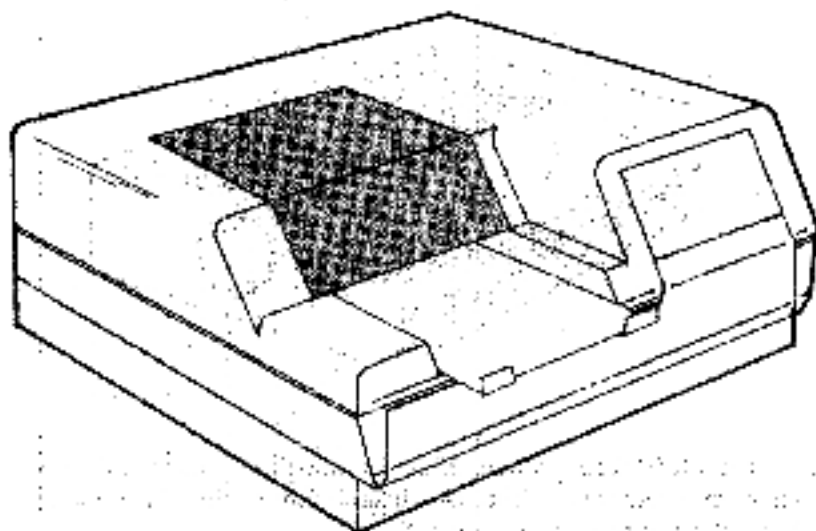
The LCG01

The LCG01 is a high-resolution serial ink-jet color printer. The LCG01 provides 154 dots/inch resolution and it prints in 216 colors.

The printer offers five fonts. One is ROM resident, and the others are *down-line loaded* at system startup. The LCG01's automatic sheet feeder holds paper and transparencies.

The LCG01 color printing system consists of the LCG01 color printer and an LCG01 graphics protocol processor. The LCG01 printer weighs 31.8 kg (70 lb), and the controller weighs 11.7 kg (26 lb). The printer measures 21.6 cm (8.5 in) x 61 cm (24 in) x 61.6 cm (24.25 in).

Figure 4-4: The LCG01



100-022719

To order an LCG01 color printing system after the initial system installation, contact your sales representative. You can install the LCG01 yourself. After assembling the printer, see Chapter 1.

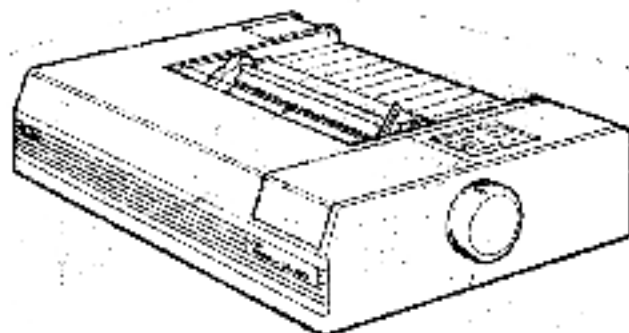
The LJ250/252 Color Printer

The LJ25x desktop dot matrix color printer is available either in serial (LJ250) or parallel (LJ252) versions. Other than the interface portion (including the connectors and configuration switches) of the logic module, the serial and parallel printers are the same. The printers can print both text and graphics in color and come with an optional paper tray.

The LJ250/252 provide up to 457 dots/centimeter (180 dots/inch) graphics resolution. Both printers come with two different fonts and print in standard USASCII, the VT100 Special Graphic set, DEC Supplemental Graphics, DEC Technical Set, National Replacement (NRC), and ISO 8-bit Supplemental sets.

The LJ250/252 weigh 4.5 kg (10 lb).

Figure 4-5: The LJ250/252



To order the LJ250/252 printers after the initial system installation, contact your sales representative. You can install the LJ250/252 yourself. After assembling the printers, see Chapter 1.

Modems

To order a modem after initial system installation, contact your sales representative. To install a modem, see Chapter 1. Table 4-1 lists the modems available for use with the VAXstation 2000.

Table 4-1: Optional Modems

Modem	Description
DF242 Scholar Plus	300, 1200, and 2400 bps (bits per second) full-duplex synchronous/asynchronous
DF224	300, 1200, and 2400 bps full-duplex synchronous/asynchronous
DF212	300, 600, and 1200 bps full-duplex synchronous/asynchronous
DF1244	1200 to 9600 bps full-duplex synchronous/asynchronous
DF124	1200 and 2400 bps full-duplex synchronous/asynchronous

DF242 Scholar Plus

The DF242 Scholar Plus modem provides full-duplex communication at speeds of 300, 1200, and 2400 bps (asynchronous) and 1200 or 2400 bps (synchronous). The DF242 is protected by a modem access security system with password verification. The DF242 features speed buffering and the support of two error correction protocols.

DF224

The DF224 modem provides full-duplex communication at speeds of 300, 1200, and 2400 bps (asynchronous) and 1200 and 2400 bps (synchronous). The DF224 allows both rotary pulse and pushbutton dialing over dial-up or leased-line networks.

The DF224 contains an autodialer with memory and provides autoanswer capability in addition to manual operation. A data/talk switch and automatic adaptive equalizer are also provided. The DF224's diagnostics test the modem at each power up.

DF212

The DF212 modem provides full-duplex communication at speeds of 300, 600, and 1200 bps (asynchronous) or 1200 and 600 bps (synchronous). The DF212 is protected by a modem access security system with password verification.

The DF212 features speed buffering and the support of two error correction protocols.

The DF124+ modem is a full-duplex, 1200/2400 bps, V.22bis/V.22tern modem.

The DF124+ modem operates in either asynchronous or synchronous mode, in full-duplex, with speed buffering from 1200 to 9600 bps without terminal adjustment. The DF124+ also provides a 4-level access security system with password validation and two error correction protocols. The autofallback feature keeps you in touch by providing communication, regardless of line conditions, over private (leased) lines or the Public Switch Telephone Network (PSTN).

The DF124 modem is a full-duplex, 1200/2400 bps, V.22bis/V.22tern modem.

The DF124 modem provides full-duplex communication at speeds of 1200 and 2400 bps (asynchronous and synchronous) over dial-up or leased-line networks. The DF124 contains an autodialer with memory, a data/talk switch, and diagnostic self-tests.

The DF124 modem is a full-duplex, 1200/2400 bps, V.22bis/V.22tern modem.

The DF124 modem provides full-duplex communication at speeds of 1200 and 2400 bps (asynchronous and synchronous) over dial-up or leased-line networks. The DF124 contains an autodialer with memory, a data/talk switch, and diagnostic self-tests.

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The DF124 modem is a full-duplex, 1200/2400 bps, V.22bis/V.22tern modem.

Tablet

The VSXXX-A8 tablet system consists of a digitizing tablet, a 4-button puck, a 2-button stylus, and a 5-foot power/signal cable. The tablet with the puck or stylus may be used as a pointing device instead of the mouse for menu selection, graphics entry, and pointer control.

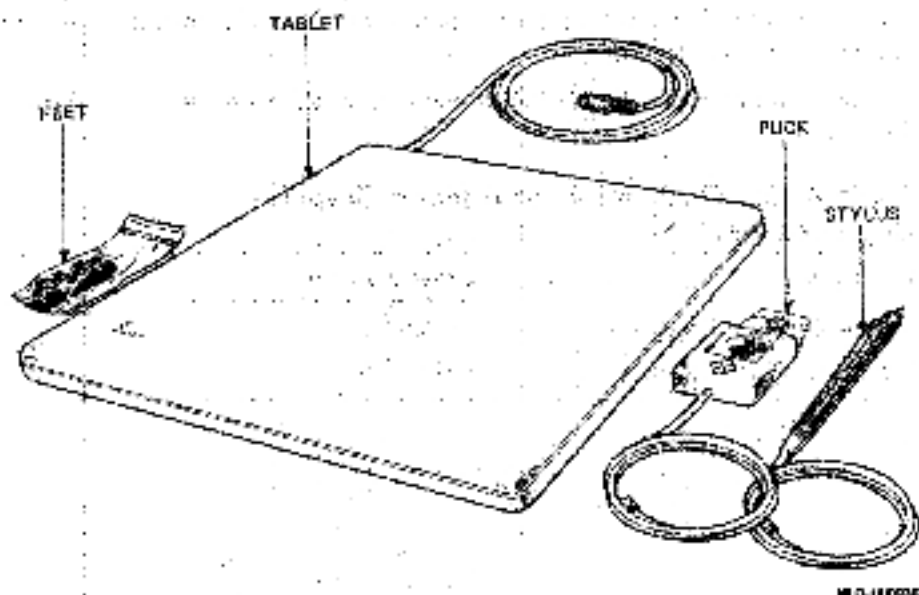
The tablet is an input device that sends X-Y coordinates to the VAXstation 2000 on the tablet's surface. The tablet has a resolution of 20 counts/millimeter (508 counts/inch). The stylus is used like a pen, while the puck is similar to a mouse.

The tablet communicates with the VAXstation 2000 through an asynchronous, full-duplex serial interface at 4800 baud ($\pm 2\%$).

The active area of the tablet is 279 mm x 279 mm (11 in x 11 in). The tablet weighs 3.2 kg (7 lb).

To order a tablet after the initial system installation, contact your sales representative. To install the tablet yourself, see Chapter 1.

Figure 4-6: The Tablet



Memory

The VAXstation 2000 contains 2 megabytes of memory on its system module. Optional memory expansion modules let you expand to a total of 14 megabytes of memory. The additional memory expansion modules are shown in Table 4-2:

Table 4-2: Optional Memory Expansion Modules

Module Number	Description
MS400-BA	4-Megabyte Memory Expansion Module
MS400-CA	12-Megabyte Memory Expansion Module

To order a memory module after the initial system installation, contact your sales representative. Contact your service representative to install a memory module.

Color or Gray-scale Option

To order a color or gray-scale upgrade kit after the initial system installation, contact your sales representative. Contact your service representative to install the 4- or 8-plane graphics coprocessor. You can install the monitor yourself (see Chapter 1).

The order numbers for the 4- and 8-plane graphics coprocessor are shown in Table 4-3.

Table 4-3: Optional 4- or 8-plane Graphics Coprocessors

Description	Order Number
4-plane Graphics Coprocessor	VS40X-MA
8-plane Graphics Coprocessor	VS40X-PA

The 4-plane Graphics Coprocessor

The VAXstation 2000 4-plane graphics coprocessor provides a 4-plane video subsystem for the VAXstation 2000 system. This raster scan video subsystem provides a resolution of 1024 by 864 pixels and displays up to 16 gray-scales or 16 colors from a palette of 16.7 million.

A bitmap display provides variable character size or positioning and inherent graphics capability. The display provides about 850,000 pixels refreshed on the screen at 60 hertz, avoiding flicker and smear of an interlaced display.

The 8-plane Graphics Coprocessor

The VAXstation 2000 8-plane graphics coprocessor provides an 8-plane video subsystem for the VAXstation 2000 system. This raster scan video subsystem provides a resolution of 1024 by 864 pixels and displays up to 256 gray-scales or 256 colors from a palette of 16.7 million. Realistic 3-dimensional shading is possible with 256 colors.

A bitmap display provides variable character size or positioning and inherent graphics capability. The display provides about 850,000 pixels refreshed on the screen at 60 Hertz, avoiding flicker and smear of an interlaced display.

To order a VAXstation 2000 color or gray-scale video upgrade option after the initial system installation, contact your sales representative. The order number of the 4-plane graphics coprocessor is VS40X-MA.

VAXstation 2000 Monitors

The VAXstation 2000 monitor information is shown in Table 4-4. Choose the monitor you want for the voltage in your country.

Table 4-4: Available Monitors

Type	Size	Voltage	Order Number
Monochrome	15 in	120 V	VR150-AA
		240 V	VR150-A3
	19 in	120 V	VR260-AA
		240 V	VR260-A3
Color	15 in	120 V	VR160-DA
		240 V	VR160-D3
		240 V SH	VR160-D4
	19 in	120 V	VR290-DA
		240 V	VR290-D3
		240 V SH	VR290-D4

Mass Storage Devices

Caution: Only devices such as the RD53-Fx or RD54-Fx, which were designed to operate with the VAXstation 2000, may be attached to connector B. Likewise, devices such as the RD53-Fx or RD54-Fx must not be connected to other systems for which they were not designed. Circuit damage and/or data loss may occur.

Expansion Box and Expansion Adapter

An expansion box allows for the configuration of additional storage devices in your system. The expansion box contains a power supply, fan, and a cavity that can hold an RD53 full-height fixed disk drive, an RD54 full-height fixed disk drive, or a TK50 tape drive.

A VAXstation 2000 system may include a maximum of two expansion boxes: one containing a fixed disk drive and one containing a tape drive.

The expansion adapter is attached to the VAXstation 2000 system box and allows for communication between the expansion box and system box.

For a description of the expansion box and expansion adapter, see Chapter 2 (Operating the VAXstation 2000). To order an expansion box or expansion adapter after initial system installation, contact your sales representative.

Contact your service representative to install the expansion adapter. You may install an expansion box (containing a fixed disk drive or a tape drive) yourself; see Chapter 1.

Fixed Disk Drives

A fixed disk drive stores information on a nonremovable disk. The fixed disks available for the VAXstation 2000 are the RD5x series, which are full-height and the RD3x series, which are half-height. Only one fixed disk drive may be installed in the system unit and only one in the expansion box, for a total of two fixed disk drives in the system.

For a description of the fixed disk drives, see Chapter 2. To order a fixed disk drive after initial system installation, contact your sales representative.

The Diskette Drive

The half-height RX33 diskette drive may be installed in the system unit. It may not be installed in an expansion box. For a description of the half-height RX33 diskette drive, see Chapter 2. The RX33 diskette drive uses RX33K and RX50K diskettes. To order an RX33 diskette drive after initial system installation, contact your sales representative. Contact your service representative to install this option.

The Tape Drive

The TK50 tape drive is available only in the expansion box. For a description of the TK50 tape drive, see Chapter 2. The TK50 tape drive requires TK50K tape cartridges. To order a TK50 tape drive after initial system installation, contact your sales representative.

Appendix A

System Specifications

Table A-1: System Dimensions

System Unit

Width	33 cm (12.75 in)
Depth	29 cm (11.25 in)
Height	14 cm (5.5 in)
Weight	12.7 kg (28 lb)

System Unit with Expansion Adapter

Width	33 cm (12.75 in)
Depth	29 cm (11.25 in)
Height	18 cm (7 in)
Weight	13.6 kg (30 lb)

Expansion Box

Width	33 cm (12.75 in)
Depth	29 cm (11.25 in)
Height	14 cm (5.5 in)
Weight	12.7 kg (28 lb)

Table A-2: System Electrical Requirements

Input	115 Vac	230 Vac
Voltage tolerance	88-132 V rms	176-264 V rms
Power source phasing	single	single
Frequency	60 Hz	50 Hz
Line frequency tolerance	47-63 Hz	47-63 Hz
Power consumption (maximum)	160 W	160 W

Table A-3: System Environmental Requirements

	Operating	Nonoperating	Storage
Maximum altitude	2400 m at 36°C	4900 m	2400 m
Temperature range	10°C-40°C	-40°C-66°C	5°C-50°C
Temperature change rate	11°C/hr max		
Maximum wet bulb temperature	23°C	28°C	32°C
Relative humidity	10-90% (noncondensing, no diskette) 20-80% (diskette and tape in use)	95% at 66°C (may condense)	10-95% (noncondensing)
Minimum dew point	2°C	2°C	2°C
Heat dissipation	155 W max	—	—

Table A-4: VR290 Color Monitor Specifications**Dimensions**

Height	47 cm (18.5 in)
Width	51.8 cm (20 in)
Depth	54.6 cm (21.5 in)

Table A-4 (Cont.): VR290 Color Monitor Specifications

Weight	36 kg (80 lb)
Picture Tube Size (diagonal)	(19 in) 486 mm viewable
Video Format	RGB color Composite video
Display Characteristics	0.31 mm dot pitch with high efficiency antiglare treatment 1024 (horizontal) x 864 (vertical) giving approximate picture size of 326 x 275 mm
Timing	
Vertical rate	60 Hz (typical)
Horizontal rate	54 kHz
Video R and B Input Signals	0.7 Vpp/75 ohm
Video G Composite Signal (with Sync)	1 Vpp/75 ohm
Power	
AC input	83-132 Vac, 50/60 Hz
Power consumption	150 W (nominal)
Fuse	2 A, 250 V slow-blow, U.S. T2A, 250 V, European
External Controls	Brightness Contrast Degauss On/off Tile lock
Operating Temperature Range	50°F-104°F (10°C-40°C)
Humidity	10%-95% relative humidity noncondensing

Table A-5: VR260 Monochrome Monitor Specifications

Dimensions	
Height	39 cm (15.4 in)
Width	45.5 cm (17.9 in)
Depth	39.5 cm (15.6 in)
Weight	18 kg (40 lb)
Picture tube size (diagonal)	480 mm (19 in) viewable
Video Format	Composite video
	Black-negative
	60 MHz bandwidth
Display Characteristics	High resolution
	Spot size approximately 0.3 mm
	Approximately 1024 (horizontal) x 864 (vertical) giving an approximate picture size of 354 mm x 282 mm
Timing	
Vertical rate	60 Hz
Horizontal rate	54 kHz
Power	
Power supply type	Transistor, switch type ac-dc converter
AC input	Switch-selectable
115 V nominal	Single-phase, 3-wire 88 to 132 V rms,
110/115/120	47 to 63 Hz line frequency
230 V nominal	Single-phase, 3-wire 185 to 264 V rms,
	47 to 63 Hz line frequency
Power consumption	Approximately 65 W
Fuse	100-120 Vac, 1 A
	1/4 x 1 1/4 in. slow-blow
	220-240 Vac, 0.5 A
	50 mm x 20 mm slow-blow
Temperature	10°C to 40°C, 50°F to 104°F

Table A-5 (Cont.): VR260 Monochrome Monitor Specifications

Humidity	10% to 90% relative humidity with a maximum wet bulb of 28°C and a minimum dew-point of 2°C
External Controls	Brightness Contrast Power on-off switch

Table A-6: VR160 Color Monitor Specifications

Dimensions	
Height	39.4 cm (15.5 in)
Width	36.9 cm (14.5 in)
Depth	45.7 cm (18 in)
Weight	23 kg (51 lb)
Shipping weight	Less than 29.5 kg (65 lb)
Tilt Range	-7 to +16 degrees
Swivel Range	± 60 degrees
Display	
Cathode-ray tube (CRT)	383 mm (15 in) diagonal Color phosphor, medium persistence P22 RGB phosphor Color 0.28 pitch shadow mask High efficiency antiglare treatment, reflects less than 1% of incident light within the visible spectrum.
Video Input	
	Composite video Red: 0.7 Vpp/75 ohm Green (with sync): 1 Vpp/75 ohm Blue: 0.7 Vpp/75 ohm

Table A-6 (Cont.): VR160 Color Monitor Specifications

Display Characteristics	1024 pixels horizontal x 864 lines vertical giving approximate picture size of 240 mm x 203 mm
	Maximum contrast no less than 25 footlamberts (f)
Timing	
Horizontal Rate Timing	
Frequency	54.054 kHz
Front porch	160 ns
Sync pulse	1850 ns
Back porch	1680 ns
Blanking interval	3.70 μ s (maximum)
Active video time	14.9 μ s
Horizontal period	18.5 μ s
Pixels displayed	1024
Vertical Rate Timing	
Frequency	60 Hz
Front porch	0 Horizontal lines
Sync pulse	3 Horizontal lines
Blanking interval	37 Horizontal lines
Active video time	16 ms
Vertical period	16.67 ms
Lines displayed	864
Video Rate (Bandwidth)	
Pixel frequency	70 MHz
Pixel period	14.45 ns (nominal)
Power	
Voltage range (switch selectable)	DA model, 88-132 Vac

Table A-6 (Cont.): VR160 Color Monitor Specifications

	D3, D4 models, 185-264 Vac
Frequency	50/60 Hz
Power consumption	125 W/200 VA (nominal) 150 W/250 VA (maximum)
External Controls and Indicators	Brightness Contrast Degauss Power switch Power indicator
Operating Temperature	10°C to 40°C (50°F-104°F)
Humidity	10% to 95% relative humidity (with maximum wet bulb of 32°C and minimum dew-point of 2°C noncondensing)

Table A-7: VR150 Monochrome Monitor Specifications

Dimensions	
Height	39.4 cm (15.5 in)
Width	36.9 cm (14.5 in)
Depth	40.3 cm (15.9 in)
Weight	16.34 kg (36 lb)
Shipping weight	Less than 19.43 kg (45 lb)
Tilt Range	-5 to +13 degrees
Swivel Range	± 60 degrees
Display	
Cathode-ray tube (CRT)	383 mm (15 in) diagonal flat square Paper white phosphor

Table A-7 (Cont.): VR150 Monochrome Monitor Specifications

	High efficiency antiglare treatment, reflects less than 1% of incident light within the visible spectrum.
Video Input	75 ohms terminated BNC composite video
Video Composite Signal (with sync)	1 Vpp/75 ohm
Display Characteristics	1024 pixels horizontal x 864 lines vertical giving approximate picture size of 240 mm x 203 mm
	Maximum contrast no less than 30 footlamberts (fl)
Timing	
Horizontal Rate Timing	
Frequency	54.054 kHz
Front porch	160 ns
Sync pulse	1850 ns
Back porch	1680 ns
Blanking interval	3.70 μ s (maximum)
Active video time	14.8 μ s
Horizontal period	18.3 μ s
Pixels displayed	1024
Vertical Rate Timing	
Frequency	60 Hz
Front porch	0 Horizontal lines
Sync pulse	3 Horizontal lines
Blanking interval	37 Horizontal lines
Active video time	16 ms
Vertical period	16.67 ms
Lines displayed	864

Table A-7 (Cont.): VR150 Monochrome Monitor Specifications

Video Rate (Bandwidth)	
Pixel frequency	70 MHz
Pixel period	14.45 ns (nominal)
Bandwidth	70 MHz
Power	
AC input voltage	88-132/185-264 Vac
Frequency	50/60 Hz
Power consumption	70 W (nominal)
External Controls and Indicators	Brightness
	Contrast
	Power switch
Operating Temperature	Power indicator
	10°C to 40°C (50°F-104°F)
	Humidity
10% to 95% relative humidity (with maximum wet bulb of 32°C and minimum dew point of 2°C noncondensing)	

Table A-8: Mouse Specifications

Physical	Measurements
Height	3.8 cm (1.6 in)
Diameter	8.3 cm (3.5 in)
Weight	0.17 kg (0.4 lb)
Power consumption	250 mA at +5 Vdc
Operating temperature	10°C-40°C
Nonoperating temperature	-40°C-66°C
Interface	RS232 voltage level compatible
	TTL compatible

Table A-8 (Cont.): Mouse Specifications

Physical	Measurements
FCC/EMI	Class B certified
Resolution	200 dots/0.125 mm (1 in)
Band rate	4800 baud

Table A-9: RD32 Fixed Disk Drive

Physical	Measurements
Storage capacity	41,820 kilobytes
Average seek time	40 ms
Data bit rate	5 MHz
Rotation speed	3600 rpm
Cylinders	820
Heads	6
Height	4.3 cm (1.7 in)
Width	14.6 cm (5.75 in)
Depth	20.32 cm (8 in)
Weight	1.31 kg (2.9 lb)

Table A-10: RD53 Fixed Disk Drive

Physical	Measurements
Storage capacity	69,632 kilobytes
Average seek time	30 ms
Data bit rate	3 MHz
Rotation speed	3600 rpm

Table A-10 (Cont.): RD53 Fixed Disk Drive

Physical	Measurements
Cylinders	1024
Heads	8
Height	8.25 cm (3.25 in)
Width	14.6 cm (5.75 in)
Depth	20.32 cm (8 in)
Weight	3.18 kg (7 lb)

Table A-11: RD54 Fixed Disk Drive

Physical	Measurements
Storage capacity	155,677 kilobytes
Average seek time	30 ms
Data bit rate	5 MHz
Rotation speed	3600 rpm
Cylinders	1221
Heads	15
Height	8.25 cm (3.25 in)
Width	14.6 cm (5.75 in)
Depth	20.32 cm (8.0 in)
Weight	3.18 kg (7.0 lb)

Table A-12: RX33 Diskette Drive

Physical	Measurements
Number of tracks	80
Number of heads	2
Track density	96 tracks/in

Table A-12 (Cont.): RX33 Diskette Drive

Physical	Measurements
Track step rate	3 μ s/track
Diskette size	13.13 cm (5.25 in)
Diskettes/diskette drive	1
Data capacity	1200 kilobytes (RX33K) 400 kilobytes (RX50K)
Recording surfaces/diskette	2 (RX33K) 1 (RX50K)
MFM data bit rate	500 kHz (RX33K) 250 kHz (RX50K)
Rotation speed	560 rpm (RX33K) 300 rpm (RX50K)
512-byte sectors per track	15 (RX33K) 10 (RX50K)
Height	4.3 cm (1.7 in)
Width	14.6 cm (5.75 in)
Depth	28.32 cm (8 in)
Weight	1.31 kg (2.9 lb)

Table A-13: TK50 Tape Drive

Physical	Measurements
Mode of operation	Streaming
Read/write method	Serpentine
Recording method	MFM
Recording medium	magnetic tape
Tape width	1.2 cm (0.5 in)
Tape length	185 m (600 ft)
Recording density	6667 bits/in
Number of tracks	22
Capacity	131.0 megabytes (unformatted) 94.5 megabytes (formatted)
Tape speed	75 in/second
Read time	35 min for full tape
Tape start time	300 ms maximum

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The Department of Chemistry at the University of Chicago is a leading center for research in chemistry and related fields. It is home to many of the world's leading chemists and their students. The department is organized into several divisions, each with its own focus and expertise. The divisions are: Inorganic Chemistry, Organic Chemistry, Physical Chemistry, Analytical Chemistry, and Biochemistry. The department also has a strong tradition of teaching and has many excellent courses for students at all levels. The department is a member of the American Chemical Society and the International Union of Pure and Applied Chemistry. It is also a member of the University of Chicago's Faculty of the Divinity School and the Faculty of the Graduate School. The department is a very active and vibrant community and is a great place to work and study.

Appendix B

Associated Documents

Note: For option and system hardware part numbers, consult your sales representative.

Not all the following documents are available in every country. Check with your sales representative for availability.

Table B-1: Documentation

Document	Order Number
HARDWARE DOCUMENTATION	
Microsystems Site Preparation Guide	EK-BA023-SF
VAXstation 2000 Hardware Information Kit	EK-ZNAGG-GZ
VAXstation 2000 System Guide	EK-V2000-SG
Workstations and MicroVAX 2000 Network Guide	EK-NETAC-UG
VAXstation 2000/MicroVAX 2000 Maintenance Kit	EK-ZNAGX-GZ
VAXstation 2000/MicroVAX 2000 Maintenance Guide	EK-VSTAB-MC
VAXstation 2000/MicroVAX 2000 Technical Manual	EK-VITAA-TM
Other Standard Hardware Documentation	
VR260 Installation/Owner's Guide	EK-VR260-IN
Mouse Installation Sheet	EK-VSXXA-IN

Table B-1 (Cont.): Documentation

Document	Order Number
Microcomputer Handbook Series	
VAX Architecture Handbook	EB-19580-20
VAX Software Handbook	EB-21812-20
Microcomputer Interfaces Handbook	EB-20175-20
Microcomputers and Memories Handbook	EB-18451-20
A Technical Summary of Digital's VAXstation Family	EB-29389-51
SOFTWARE DOCUMENTATION	
VMS Software	
VMS Local Area VAXcluster Manual	AA-JP20C-TE
ULTRIX Software	
ULTRIX-32w Basic Installation Guide for the VAXstation 2000	AA-KU45A-TE
ULTRIX-32w Advanced Installation Guide for the VAXstation 2000	AA-KU43A-TE
ULTRIX-32w Documentation Kit Overview	QMX32-GZ
ULTRIX WS-Release Notes	AA-HF07B-TN
ULTRIX-32w Technical Summary	AA-GT67A-TN
ULTRIX-32w Installation and Management Guide	AA-GT88A-TN
Using and Customizing the Window Manager	AA-GT89A-TN
ULTRIX-32w QDSS/VCB02 Driver Reference	AA-GT90B-TN
ULTRIX-32w QDSS Interface Library Programming	AA-GT91B-TN
ULTRIX-32w Xlib Programming Reference	AA-GT92A-TN
ULTRIX-32w GKS/2b Programming	AA-GT93B-TN

Table B-1 (Cont.): Documentation

Document	Order Number
ULTRIX Software	
ULTRIX-32w Services Reference	AA-GT94B-TN
C Language X Interface	AA-HF10A-TN
LN03 Printer	
Installing and Using the LN03	EK-01LN03-UG
LN03 Programmer Reference Manual	EK-01LN03-RM
LN03 PLUS Printer	
LN03 PLUS User Guide	EK-LN03S-UG
LN03 PLUS Programmer Reference Manual	EK-LN03S-RM
LN03S Bitmap Option Installation Guide	EK-LN03S-IG
LN03R SCRIPTPRINTER	
LN03R SCRIPTPRINTER Installation Guide	EK-1LN03R-UG
LN03R SCRIPTPRINTER Operator Guide	EK-1LN03R-OG
LA210 Printer	
Installing the LA210 Letterprinter	EK-LA210-IN
LA210 Letterprinter User Guide	EK-LA210-UG
LA210 Letterprinter Programmer Reference Manual	EK-LA210-RM
LA210 Letterprinter Operator and Programmer Reference Guide	EK-LA210-RC
LA210 Letterprinter Emulation Modes Reference Guide	EK-LA210-EG

Table B-1 (Cont.): Documentation

Document	Order Number
LA75 Printer	
Installing and Using the LA75 Companion Printer	EK-OLA75-UG
LA75 Companion Printer Programmer Reference Manual	EK-OLA75-RM
LA75 Companion Printer Programmer Reference Card	EK-OLA75-RC
LA75/LA75P Pocket Service Guide	EK-OLA75-PS
LA75/LA75P Technical Manual	EK-OLA75-TM
LCG01 Installation	
LCG01 Color Printing System Instruction Operator's Manual	EK-LCG01-IN
LCG01 User's Guide	EK-LCG01-UG
LCG01 Pocket Service Guide	EK-LCG01-PS
LJ250/252 Printer	
Installing and Using the LJ250/252 Companion Color Printer	EK-LJ250-DK
Tablet	
Tablet Information Sheet	EK-VSXXB-IN
RX33 Diskette Drive	
RX33 Diskette Drive Technical Description	EK-RX33T-TM
RD53 Fixed Disk	
RD53 Fixed Disk Technical Description	EK-RD53A-TD

Table B-1 (Cont.): Documentation

Document	Order Number
RD54 Fixed Disk	
RD54 Disk Drive Technical Description	EK-CRD54-TD
TK50 Tape Drive	
TK30 Tape Drive Subsystem Owner's Manual	EK-LPF05-OM
TK30 User's Guide	EK-CTK50-UG
TK30 Technical Manual	EK-CTK50-TM
VR290 Color Monitor	
VR290 Installation/Owner's Guide	EK-VR290-IN
VR260 Monochrome Monitor	
VR260 Installation/Owner's Guide	EK-VR260-IN
VR160 Color Monitor	
VR160 Installation/Owner's Guide	EK-VR160-IN
VR150 Monochrome Monitor	
VR150 Installation/Owner's Guide	EK-VR150-IN

Table B-1 (Cont.): Documentation

Document	Order Number
DECconnect and Standard Ethernet	
DECconnect System General Description	EK-DECSY-GD
DECconnect System Requirements Evaluation Workbook	EK-DECSY-EG
DECconnect System Installation and Verification Guide	EK-DECSY-VG
DECconnect System Stand alone ThinWire Networks: Planning and Installation Guide	EK-DECSY-TC
DECconnect System Planning and Configuration Guide	EK-DECSY-CG
Remote System Manager Server Documentation Kit	QLB13-GZ
Remote System Manager Client Documentation Kit	QLB14-GZ

Appendix C

Port Pin Out Signal Assignments

Table C-1: Printer Connector (J3)

Pin	Signal	Pin	Signal	Pin	Signal
1	Chassis ground	2	PTR_XDAT	3	PTR_RDATA
4	No connection	5	+12 Vdc	6	No connection
7	Chassis ground	8	Ground	9	PER_LNA

Table C-2: Video Connector (J5)

Pin	Signal	Pin	Signal	Pin	Signal
1	VID_RED	2	Color return	3	Monochrome return
4	Fused <5 Vdc	5	AUX_RDAT	6	Keyboard ground
7	Chassis ground	8	Fused +12 Vdc	9	Monochrome signal
10	VID_GREEN	11	VID_BLUE	12	-12 Vdc
13	AUX_XDAT	14	KBD_RDAT	15	KBD_XDAT

Table C-3: Communication Connector (J10)

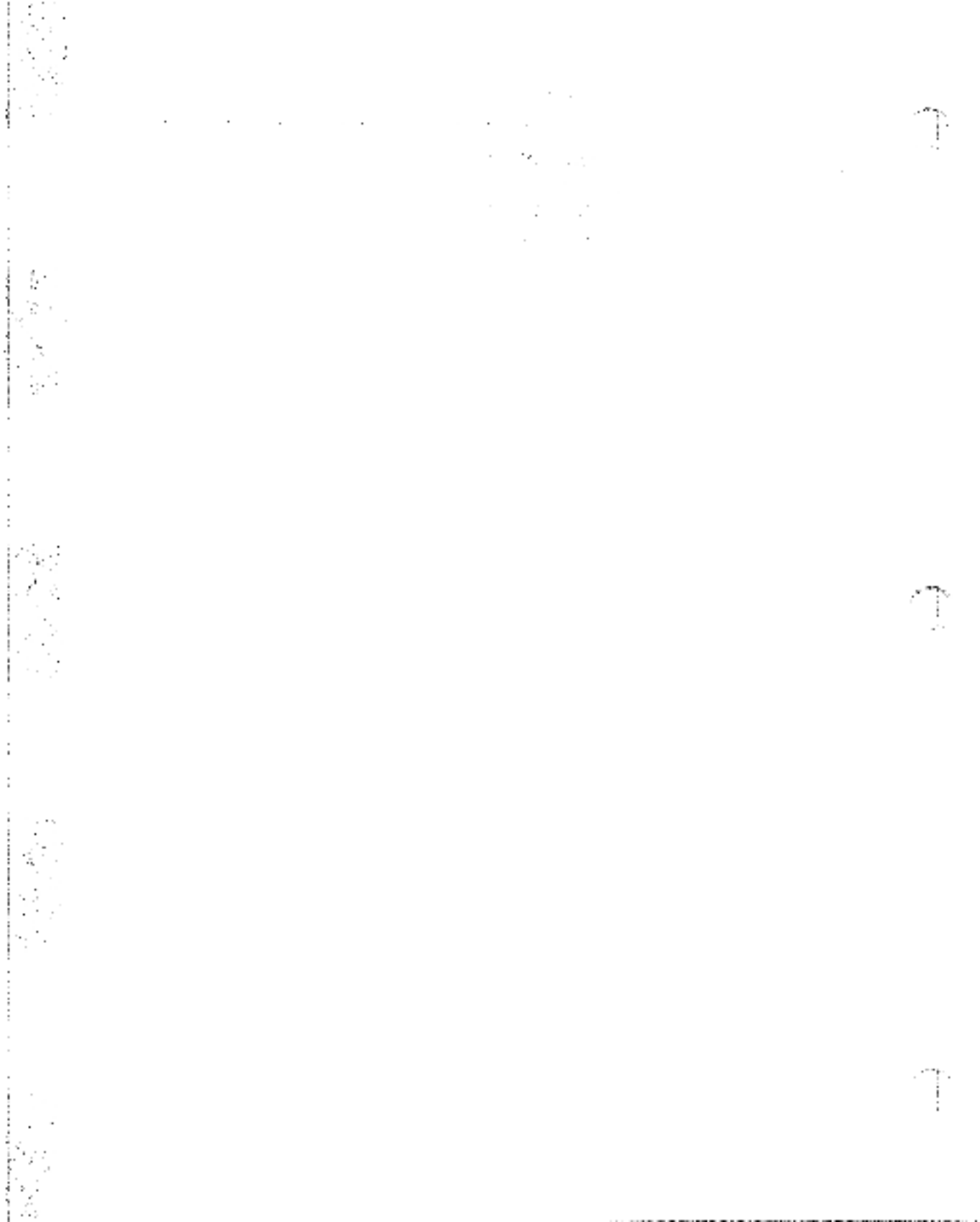
Pin	Source	CCITT	EIA	DEC	Description
2	DTE	103	3A	TxD	Transmitted Data
3	Modem	104	BB	RxD	Received Data
4	DTE	105	CA	RTS	Request to send
5	Modem	106	CB	CTS	Ready for sending
6	Modem	107	CC	DSR	Data set ready
7		102	AB	SIG GND	Common signal return

Table C-3 (Cont.): Communication Connector (J10)

Pin	Source	CCITT	ELA	DEC	Description
8	Modem	109	CF	CD	Received line signal detect
12	Modem	112	CI	SPQMI	Speed mode indicate
16	DTE	141		LLBK	Local Loopback
20	DTE	108/2	CD	DTR	Data terminal ready
22	Modem	105	CB	RI	Calling Indicator
23	DTE	111	CH	DSRS	Data signaling rate select
24	Modem	142		TMI	Test mode indicate

Glossary

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divider here.
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this sheet.**



Glossary

32-bit length

The length of the internal data path of the CPU. This length provides more concentrated data, allows more data types, and enables more data to be transferred at one time than a 16-bit internal data path.

application program

A program, such as a financial spreadsheet program, that performs an end-user task.

ASCII

American Standard Code for Information Interchange. A set of 7- or 8-bit binary numbers representing the alphabet, punctuation, numerals, and other special symbols used in text representation and communications protocol.

backup copy

A copy of data stored on your disk. The duplicate copy is stored on either RX33 diskettes or TK50 tape cartridges.

backup process

The process of making copies of the data stored on your disk so that you can recover that data after an accidental loss. You make backup copies on RX33 diskettes, TK50 tape cartridges, or over a network.

baud rate

The speed at which signals are serially transmitted along a communications line. One baud equals one bit/second.

binary

A number system that uses two digits: 0 and 1. They are represented in system circuitry by two voltage levels, and programs are executed in binary form.

bit

A binary digit; the smallest unit of information in a binary system of notation, designated as a 0 or a 1.

bitmap

Memory used to store an array of graphic image data. Each element of the array corresponds to one or more pixels in a video display or one or more dots on a laser printer.

bitmap graphics

The type of graphics supported by the VAXstation 2000. Bitmap graphics are defined by the workstation software and can individually set the shade of gray (or color) of each picture element (pixel) on the screen.

boot

See **bootstrap**.

bootable medium

A fixed disk, diskette, or magnetic tape cartridge containing software (such as an operating system) a bootstrap program can load into the system memory and execute.

boot device

The device that is booted at system startup. (See **bootstrap** and **device**.)

bootstrap (or boot)

To execute the bootstrap loader program, a program that is always resident in the system when the power is on. In the VAXstation 2000, this happens automatically whenever system power is turned on. The bootstrap loader loads the operating system software from a mass storage device and executes it. A bootstrap program.

byte

A group of eight binary digits (bits). A byte is one-quarter of a VAX system word.

central processing unit (CPU)

The part of the system that controls the interpretation and execution of instructions. In the VAXstation 2000, CPU functions are contained on one MicroVAX II CPU chip.

cluster

A group of computers networked together that share disk storage, application programs, and other computer resources.

communications

A cable along which electrical signals are transmitted. Devices or systems that are connected by a communications line can share information and resources.

computer system

A combination of system hardware, software, and external devices that performs operations and tasks.

console mode

The state in which the computer is controlled from the console terminal. The VAXstation 2000 can be put in console mode by pressing the halt button on the rear of the VAXstation 2000 system unit. Console mode is indicated by the console prompt (>>>) on the monitor screen. The other mode the system can operate in is program mode. (See **program mode**.)

console prompt

A prompt used for communication between the system manager and the computer.

controller

A system component, usually a printed circuit board, that regulates the operation of one or more peripheral devices.

CPU

Abbreviation for central processing unit. (See **central processing unit**.)

CRT (cathode ray tube)

A vacuum tube that generates and guides electrons onto a fluorescent screen to produce characters or graphics. This term is often used to refer to a monitor.

cursor

A blinking line or figure on the screen that indicates where the next character the user types will appear.

data

A formal representation of information suitable for communication, interpretation, and processing by humans or computers.

data transmission

The movement of data in the form of electrical signals along a communications line.

debug

To detect, locate, and correct errors (bugs) in hardware or software.

device

The general name for any unit connected to the system that is capable of receiving, storing, or transmitting data. (See **input/output (I/O) device** and **controller**.)

device icon

An icon on the back of the VAXstation 2000 that shows the device that can be plugged into the connector.

device name

The name by which a device or controller is identified in the system. Use that name to refer to that device when you are communicating with the system.

diagnostics

Programs that detect and identify abnormal system hardware operation. The diagnostics for the VAXstation 2000 is located in read-only memory. (See **read-only memory**.)

disk

A flat circular plate with a coating on which data is magnetically stored in concentric circles (tracks). A fixed disk resides permanently inside a disk drive, while a diskette is removable.

disk drive

A device that holds a disk. The drive contains mechanical components that spin the disk and move the read/write heads that store and read information on the surface of the disk.

diskette

A flexible, "floppy" disk contained in a square jacket. Diskettes can be inserted and removed from diskette drives.

diskette drive

A disk drive that only reads or writes on removable diskettes.

dot matrix

A method of generating characters for printing that uses dots to produce readable characters.

down-line load

To send a copy of a system image or other file over a line to the memory of a target node.

error message

A message displayed by a system to indicate a mistake or malfunction.

Ethernet

A type of local area network based on Carrier Sense Multiple Access with Collision Detection (CSMA/CD).

file

A collection of related information treated by the system as a single unit.

fixed disk

See disk.

format

To prepare a diskette to accept data.

formatted data

Data that is structured in a particular pattern to be understood by the system software.

GKS

Graphics Kernel System. GKS acts as one of the graphics interfaces for the VAXstation 2000. GKS is an international standard for graphics applications that run on many different devices and equipment.

graphics coprocessor

A special-purpose CPU, with its own set of commands, data formats, and an instruction counter, which executes a sequence of display instructions to create a drawing on the display device.

gray-scale

Sixteen levels of intensity from black to white available with the 4-plane graphics coprocessor option.

hard-copy terminal

A terminal that displays information on paper. Compare to Video terminal.

hardware

The physical components—mechanical and electrical—that make up a system. Compare to Software.

head

The part of a fixed disk drive, diskette drive, or tape drive that reads, records, and erases data. Also called read/write head.

host system

The primary or controlling computer in a multiple computer network.

I/O

Abbreviation for input/output. (See **input/output (I/O) device**.)

icon

A graphic symbol that gives a visual image of a device or a procedure's function. Icons often appear on the system's enclosure to aid the user in locating connectors and controls. On a workstation, a graphic symbol displayed on a monitor or terminal screen, which represents a window or action. A window may be shrunk to an icon.

input/output (I/O) device

A piece of equipment that accepts data for transmission to (input) and from (output) the system. For example, a terminal.

interactive

A method of communicating with the system. In an interactive session, you type a command at the keyboard and the system executes the command and responds with a prompt character for another command.

interface

A device or piece of software that allows the components of the system to communicate with each other.

K

The symbol that means 2 to the 10th power (or 1024 in decimal notation). Also, an abbreviation for kilo (thousand).

kilobyte

1024 bytes.

LED

Light-emitting diode. LEDs are used as indicators on the system enclosure.

load

To copy software (usually from a peripheral device) to memory. To physically place a disk in a disk drive or a tape in a tape drive.

local area network (LAN)

A data communications system designed for a small geographic area that offers high-speed communications channels optimized for connecting information-processing equipment. For example, ThinWire Ethernet.

M

The symbol for 1024 squared (1,048,576 in decimal notation). Also, an abbreviation for mega (million).

magnetic tape

A tape used for storing data that is made of plastic and coated with magnetic oxide. Also called magtape.

megabyte

1,048,576 bytes.

memory

The area of the system that electrically stores instructions and data, often temporarily.

memory module

A printed circuit board that contains additional memory for the system.

module

A printed circuit board that contains electrical components and electrically conductive pathways between components. A module stores data or memory or controls the functions of a device. (See **printed circuit board**.)

mouse

A relative-positioning input device that is rolled across the desktop to move the pointer or mouse cursor on the monitor screen and is used to select menu options and draw graphics. The mouse is palm sized and contains three buttons (function keys) and a ball bearing.

network

A group of individual computer systems that are connected by communications lines to share information and resources.

node

An individual information-processing unit, such as a computer, workstation, or peripheral device, that is connected to a network.

off-line

Pertaining to equipment, devices, and events that are not controlled by the system or have been logically disconnected from the system.

on-line

Pertaining to equipment, devices, and events that communicate with the system.

operating system

A collection of system programs that controls the operation of the system and allows the user access to data files, input/output devices, and applications programs. The operating system software performs such tasks as assigning memory to programs and data, processing requests, and scheduling jobs. VMS and ULTRIX are the two operating systems offered for the VAXstation 2000.

output device

A device that accepts data from the system. A printer is an example of an output device.

peripheral device

A device that provides the CPU with additional memory storage or communication capability. Examples are disk and diskette drives, video terminals, and printers.

plotter

A device to construct visual representations of data by an automatic pen or pencil. Plotters can also receive plotting coordinates from digital computers.

pointing device

A terminal input device that allows you to make a selection from a menu or to draw graphics. (See **mouse** and **tablet**.)

port

The name of the socket or connector at the back of the computer to which a terminal, printer, or other communication devices are connected.

power-up sequence (power up)

A series of ordered events that occur when you supply power by turning on the system.

printed circuit board

A piece of fiberglass board used to make modules. (See **module**.)

printer

A peripheral device that provides paper copies of information stored on the system.

program

The sequence of instructions the system uses to perform a task. (See **software**.)

program mode

The state in which the computer is controlled by the operating system. After the operating system is installed, the system will always operate in program mode, unless you put it into console mode. (See **console mode**.)

prompt

Words or characters that the system displays to indicate that it is waiting for you to type a command.

puck

A palm-sized device that slides on the tablet's surface and together function as a pointing device. (See **pointing device** and **tablet**.)

RAM

Abbreviation for random-access memory. (See **random-access memory (RAM)**.)

random-access memory (RAM)

Memory that can be both read and written into and can randomly access any one location during normal operations. The type of memory the system uses to store the instructions of programs currently being run.

raster

A linear measurement unit for graphics characters on the video screen.

read-only memory (ROM)

A memory whose contents cannot be modified. The system can use the data contained in a ROM but cannot change it.

remote install

See **down-line load**.

ROM

Abbreviation for read-only memory. (See **read-only memory (ROM)**.)

run

A single continuous execution of a program (noun). To execute a program (verb).

software

Programs executed by the system to perform a chosen or required function. Compare to Hardware.

storage medium

Any device capable of recording information; for example, a diskette.

store

To enter data into a storage device, such as a disk, or into memory.

stylus

A penlike device that draws on the tablet's surface and together function as a pointing device. (See **pointing device** and **tablet**.)

system

A combination of system hardware, software, and peripheral devices that performs specific processing operations.

system image

The image that is read into memory from disk when the system is started up (booted).

system management tasks

Tasks performed by an assigned person to operate and maintain the system. That person is usually the system manager.

tablet

An absolute-positioning input device composed of a flat-surfaced digitizing tablet, a puck, and a stylus. The tablet is a drawing surface. The puck and stylus are pointing devices that move the cursor on the monitor screen, draw graphics, and make selections from the menu.

tape drive

A device that contains mechanical components and holds, turns, reads, and writes on magnetic tape.

T-connector

Connector used to join ThinWire Ethernet cable sections. The connector also has a connector that is attached directly to a station.

terminal

An input/output device that lets you communicate with the system. Terminals are divided into two categories: video and hard-copy.

terminator

A special connector used on one or both ends of an Ethernet segment that provides the 50-ohm termination resistance needed for the cable.

text cursor

A block or line, usually blinking, displayed on a CRT screen to indicate where the next character typed will appear.

ThinWire

A DIGITAL trademark used to describe its 10base2 (IEEE standard 802.3 compliant) Ethernet products used for local distribution of data.

ThinWire connector

The connector on the rear of the VAXstation 2000 system unit to which the ThinWire Ethernet cable is attached.

ULTRIX-32w

The window management software for a MicroVAX-based system. The system must run ULTRIX-32m as the operating system. Workstation software lets you control and view several programs on one screen. You specify the window with which to interact by using a pointing device.

user command

An order you give to the system through a keyboard, mouse, or other input device.

user input device

A piece of equipment that is used to transfer data to the system. For example, keyboard, disk, tape, and system are input devices.

video terminal

A terminal that displays information on the screen of a cathode ray tube (CRT). Compare to Hard-copy terminal.

VLSI

Very Large Scale Integration of integrated circuit chips. A large number of chips can fit on a printed circuit board; therefore, fewer boards are needed, and the system can be smaller.

Winchester disk

A hard disk permanently sealed in a drive unit to prevent contaminants from affecting the read/write head. The sealed head/disk assembly (HDA) helps to increase drive reliability and ensure data integrity. (See **fixed disk**.)

window

An area on your monitor screen in which you can start, run, and view a separate process. Windowing is supported by both VMS and ULTRIX workstation software.

word

The largest number of bits (32) that the VAXstation 2000 system can handle in an operation. These systems can also handle longwords (that is, two words or 64 bits).

workstation

A single-user system that offers high-performance, high-resolution graphics and can function in a network environment.

write-protect

To protect a disk, diskette, or other storage medium from the addition, revision, or deletion of information.

write-protect notch

The small notch on the side of an RX33 or RX50 diskette that you can cover with an adhesive-backed foil label or tab to prevent loss of data by accidental overwriting.

write-protect switch

The switch that you slide down on a TK50 tape cartridge to prevent loss of data by accidental overwriting.

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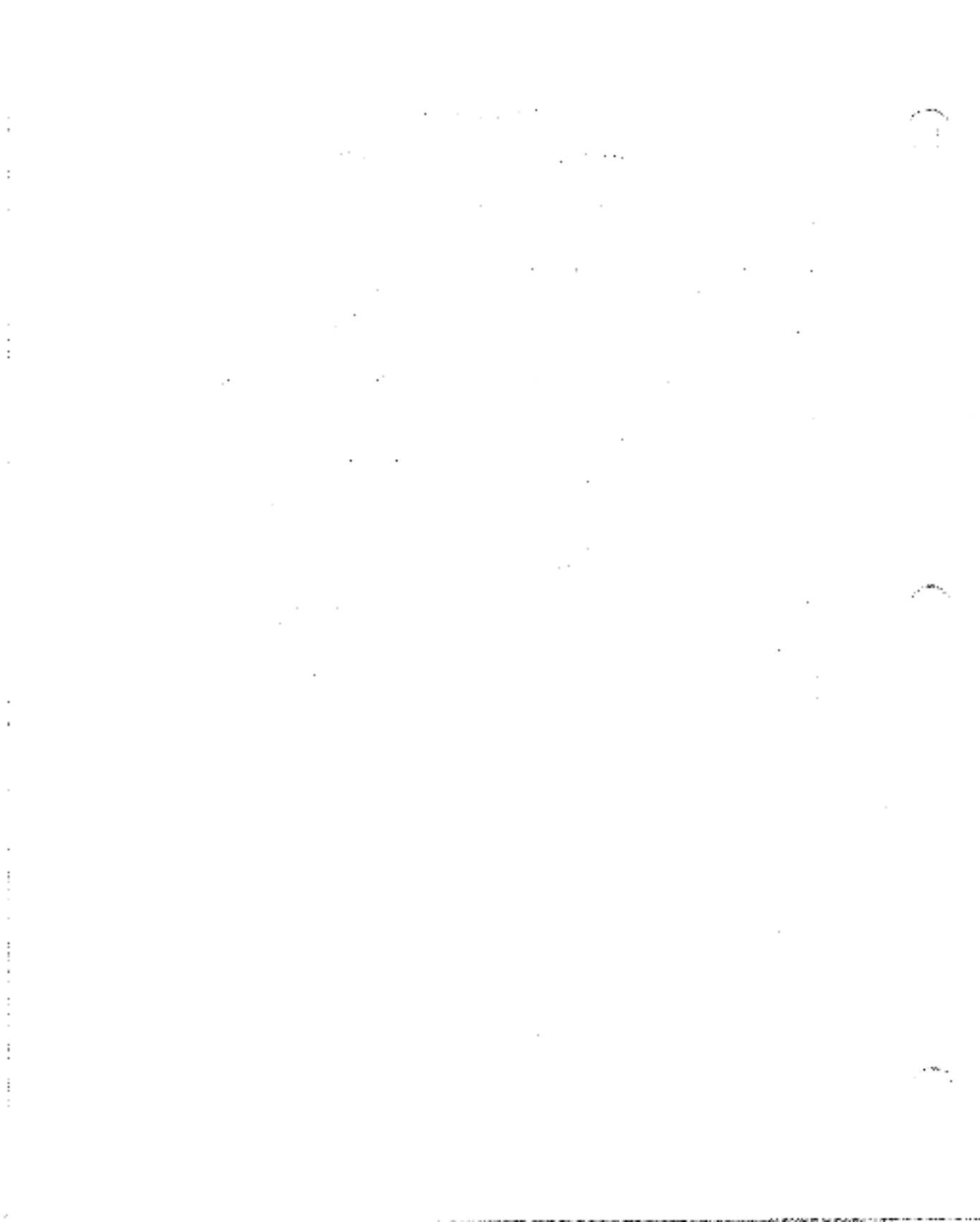
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